Chemical Age

VOL. 81 No. 2060

3 January 1959

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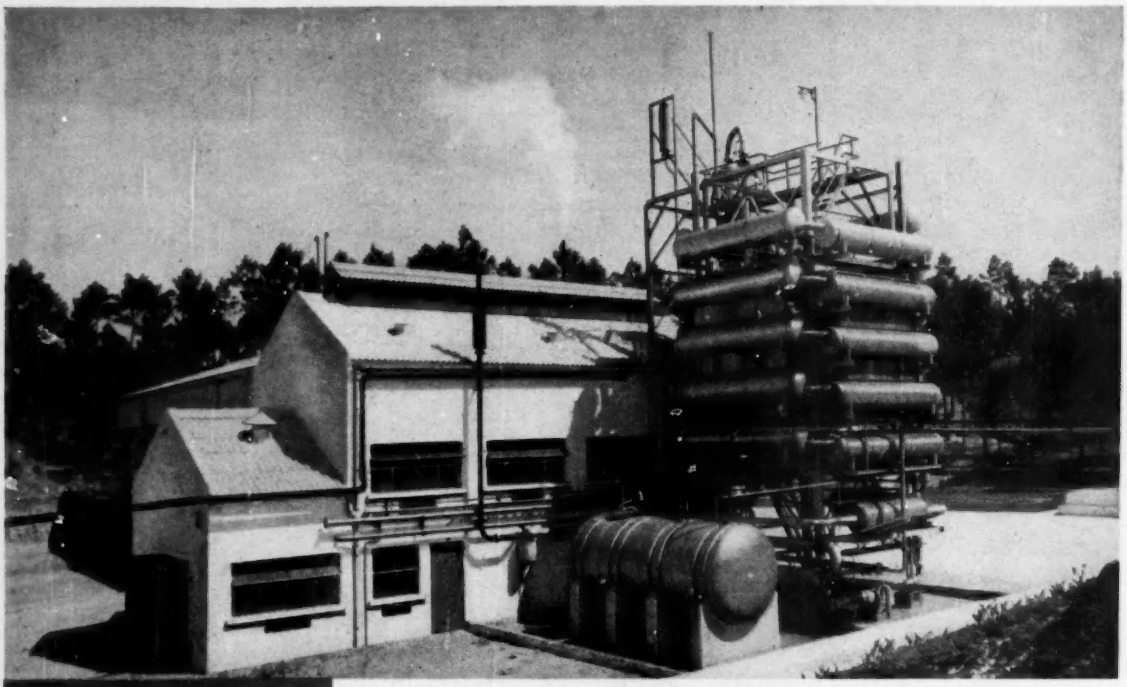

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Permanent House, The Headrow, Leeds 1. [*Leeds* 22601]

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POTASH SUBSIDY PLEA

ONE of many recommendations in the recently issued report of the Grassland Utilisation Committee is that the fertiliser subsidy scheme should be expanded to include potash. At present, of course, farmers receive subsidies to assist their purchase of nitrogenous and phosphate fertilisers. The reason given when this distinction has been queried in the past is that potash prices are decided by a few suppliers and it can never be certain that subsidy benefits would in fact be fully enjoyed by the farmers, i.e., it is felt that there is too little competition in potash supply, and a subsidy which in effect made potash cheaper for farmers might be reduced in value by rises in price of potash.

This fear has a somewhat limited validity. The fairness of potash prices can always be checked against world prices—and some sharp rise in potash prices quoted in this country could easily be checked by seeing whether similar increases were occurring elsewhere in Europe. In any event, the question whether monopolistic practices prevail in the fertiliser market here is being examined by the Monopolies Commission.

A more cogent reason for not giving a potash subsidy is that potash consumption has been steadily rising without one; from 1953 to 1957 nitrogen use rose (U.K.) from 230,000 to 302,000 tons (as N) and potash use (as K_2O) rose from 231,000 to 318,000 tons. During this period nitrogen enjoyed a generous subsidy, potash none. The Grassland Utilisation Committee admits this, but nevertheless fears that the absence of subsidy help for potash will lead to unbalanced fertiliser applications to grass. Certainly present estimates of nutrient use on grassland show slightly higher average rates for nitrogen than for potash, but the difference is not a large one—any real danger lies in the future when and if nitrogen rates have been substantially increased without similar increases for potash.

The Committee would also like to see more use of straight potash on grassland. The connection with this and a subsidy for potash is psychological rather than logical. Almost all potash now applied is in compound form, i.e., pre-mixed with nitrogen and/or phosphate. This is a favoured farm practice because compounds carry subsidies according to their nitrogen and phosphate contents; these subsidies are in no way raised because potash is also present, but many farmers look upon the subsidy per ton of compound as an entirety, covering all its nutrient content. There is, however, some evidence that this use of compounds to supply all the potash grass receives yearly is ill-timed and may increase the risk of hypomagnesaemia in cattle grazing spring grass. The use of potash at a different time from nitrogen is said to be one of the preventitive measures for this animal disease. It remains a fact, nevertheless, that potash in a compound or potash in unmixed form is now unsubsidised, and the position would hardly be altered if a subsidy applied to potash; for it would apply equivalently to mixed or unmixed potash.

Government willingness to extend the fertiliser subsidy to potash seems unlikely as yet. There is no real evidence that potash use is lagging behind, and until such a situation does become real, there seems a small case thus increasing subsidy expenditure, which for the current year on nitrogen and

phosphate is expected to amount to about £27,000,000. Also, the new Small Farms Scheme, also recently announced, is likely to encourage greater fertiliser use and increase the total subsidy cost by another £4,000,000.

With regard to use of potash in North America the U.S. potash industry is predicting that North American capacity will be more than double by 1970-71, while Canadian estimates of future consumption indicate that potash production will have to double itself again by 1985 if all needs are to be met. The Royal Commission on Canada's Economic Prospects is reported as saying that a minimum of 8 million and a maximum of as much as 10 million tons of K_2O will have to be supplied if Canada and the U.S. are to counteract annual soil losses 25 years hence.

The U.S. industry appears to be in a transition period at present for during the next few years producers are going to have to decide whether to sink high capital investments into potash-rich areas. Of concern in the matter is that potash prices are at their lowest point since before World War I.

WETTED WALL TRAY

A NEW kind of distillation tool has been developed by a Pittsburg, U.S., consultant Max Leva. The new tray is described as a perforated horizontal tray with short downcomers on each hole. The description 'wetted wall tray' is gained since liquid wets the inside of the downcomers as well as the tray itself.

The downcomers are stated to be the key to the wetted wall tray. These are staggered from tray to tray so that the gas stream rising through one downcomer is deflected downward and across before it can enter the downcomer on the tray alone. This action gives a higher gas velocity and, at the same time, higher pressure at the mouth of the downcomers than in the main gas stream. This pressure difference causes liquid levels to vary across each tray, and a good deal of mixing takes place. The gas stream moves counter current to the liquid flow, similar to the stream flows in a wetted wall column. Turbulence caused by the pressure differences is stated to be one of the reasons why this tray gets good mass transfer.

In gas absorption tests the wetted wall tray has proved to be 65% more efficient than a perforated tray without downcomers. Also, at the same time, the pressure drop is cut by more than half. In Leva's tray the pressure drop per transfer unit is noted as 0.25 in. of water with wetted wall trays, compared to 0.62 in. of water for perforated trays. In particular, the wetted wall tray is stated to work very well at low liquid rates where packed towers cannot be used. The gas stream is not required to 'blow through' the liquid as with sieve plates, perforated plates or bubble caps. There is thus no hydrostatic head to overcome and liquid entrainment is kept at a minimum.

As the trays have been found to always provide a positive wetted surface, they are being recommended for vacuum distillation where liquid flows normally are very low. With proper design, it is believed that the wetted wall tray will take much higher liquid flows, and may be used for fractionations in general and gas absorptions.

NON-ELECTROLYTIC CHLORINE

EAST German chemist, Dr. Hennig, of Bitterfeld, has revealed (*Chemical Association of the German Democratic Republic*—current issue) that he, together with four colleagues, has been set the task of discovering a new process, by which chlorine can be manufactured from hydrogen chloride without the use of electrolysis. This research is being carried out for two main reasons: the present shortage of chlorine in East Germany and the remarkably large quantities of hydrogen chloride which will be produced as by-product when the three-year plan for large-scale production of magnesium oxide from magnesium chloride is put under way. This excess hydrogen chloride will be taken up partly by the expanding polyvinylchloride industry.

First stage in the working party's research, which is still in progress, was a study of former manufacturing processes. The orthodox Deacon process, which consists of air oxidation over copper, was dismissed because of its disadvantages—quick sublimation of the copper and difficulties in the production of chlorine form a gas mixture consisting mostly of nitrogen and excess hydrogen chloride. Other processes—the Oppauer process and those of Dow, Grosvenor and the nitrogen division of the Allied Chemical and Dye Company—were all studied in detail.

As a result of these studies, it was decided to develop a Deacon contact process which could quantitatively transform oxygen plus excess gaseous hydrogen chloride possessing a corresponding thermodynamic balance, and this at the lowest possible temperature. Although work is continuing on the manufacturing technique, such a process has been developed and the resultant product is stated to be satisfactory in all its properties.

The chlorine, which contains only a small proportion of foreign gases is first dried and then liquefied. Excess hydrogen chloride is washed in a 20% water/hydrochloric acid solution or in one of magnesium chloride, this taking place in igurite containers, and then put through a new type of vaporiser, this, too, being made of igurite, later to be oxidised again. There is therefore no need to dry the hydrogen chloride thoroughly, the containers in which it is processed being of a material resistant to damp hydrogen chloride.

TECHNECIUM ISOLATED

IN Volume 3 of the *U.S.S.R. Journal of Inorganic Chemistry* a report appears by M. S. Fadeyeva, O. N. Pavlov and V. V. Bakunina of Russian work on the extraction from neutron-irradiated molybdenum or technecium (Tc-99). The extraction which followed as an extension of groundwork by J. B. Gerlit, was made from molybdenum of the type mentioned using methylethyl ketone as extractant.

The distribution coefficient of the Tc as between pure water and methylethyl ketone amounted to only 1.3, the report states. $NaNO_3NH_4NO_3$ and $Ca(NO_3)_2$ showed a very small salting-out effect on Tc.KOH, $(NH_4)_2CO_3$ and K_2CO_3 increased the distribution coefficients, however, to a very large extent, and due to its poor solubility in methylethyl ketone K_2CO_3 effected a good salting-out of Tc from the aqueous to the organic phase under all test conditions.

Methylethyl ketone proved itself a very selective extractant for both Tc and for Rhenium.

The distribution coefficients for the radioactive impurities in irradiated modybdenum were from 0.0002 to 0.0005 and for molybdenum in 1.10^{-6} to 2 m. solution from 0.0005 to 0.0007. With the use of a scintillation spectrometer, ^{65}Zn, ^{60}Co, ^{181}W, ^{124}Sb, ^{95}Zr and ^{59}Fe were detected as radioactive impurities.

A double washing of the organic phase with aqueous 5 to 6 N K_2CO_3 solution yielded Tc-99 with a half-life of 6.1 h. This was radioactively pure; the radioactivity of the preparation had died away after 56 to 70 h. The final solution contained very little K_2CO_3. The yield was one of 99.9%. Tc-99 m. was identified by β-absorption measurement on aluminium and the TcO_4-ion detected by means of an UV-spectrum.

About 1 mg. of Tc was isolated in the primary experiments on which the report was based.

BRIGHT FUTURE FOR I.C.I.'s NEWLY DEVELOPED ELECTRODES

Advantages of Platinised Titanium

RESEARCH by I.C.I.'s Metal Division has provided impressive evidence that titanium carrying very small deposits of platinum can be used for completely non-consumable anodes and that these offer considerable advantages over conventional electrode materials in various electro-chemical processes. This development is said to make available an anode material as efficient as platinum at much lower cost.

Applications are in electrolytic cells, cathodic protection, water purification by electrodialysis, production of sodium hypochlorite for sterilisation, electro-descaling and electro-galvanising, separation of colloids and rhodium plating equipment.

Titanium, though virtually immune to corrosion in brine, is not a suitable anode material because the protective oxide film which forms on its surface resists the passage of an electric current. Attempts to force a passage by using high voltages may result in failure of the film and severe local corrosion. Research has shown, however, that this high resistivity is very much reduced when titanium is brought into electrical contact with platinum, deposited on the titanium either in strip or wire form or as a thin film.

Most of the current is carried by the platinum, while the proportion carried by the titanium is sufficient to effect the anodic polarisation of this metal and to ensure continuous maintenance of the oxide film. This phenomenon persists even if the titanium is exposed to the electrolyte by discontinuities in the platinum film and at current densities of more than 500 amps./sq. ft.

Electrolytic Cells. One specific field of application is that of electrolytic cells used in the chemical industry for the manufacture of caustic soda and chlorine from brine. Because of the importance of these basic chemicals, considerable work has been done towards evaluating the advantages of platinised titanium anodes over the commonly-used graphite anodes.

No Adjustment Techniques

Of the factors contributing to the efficient operation of a cell, none is more important than the maintenance of the calculated minimum gap between anode and cathode. If the distance is widened by erosion of the electrodes, the ohmic resistance of the electrolyte in the gap increases, the cell voltage rises and efficiency falls. By utilising the excellent erosion and corrosion resistance of titanium, close positioning of anode and cathode can be achieved and maintained without recourse to adjustment techniques.

The oxygen overvoltage of platinum is even higher than that of graphite, readily permitting the production of oxygen-free chlorine.

It has long been recognised that a considerable saving in electrical energy would result from the use of an electrode material with a lower chlorine overvoltage at the electrode surface than is experienced with graphite electrodes. There is every indication that the employment of platinised titanium anodes would contribute to such economies.

The gradual erosion of a graphite anode in brine is accompanied by the generation of carbon dioxide. The adoption of platinised titanium would remove this source of CO_2 in the chlorine produced at the anode. Moreover, the absence of graphite sludge eliminates the need for periodical cleaning and, in diaphragm cells, the risk of blockage. Platinised titanium anodes are free from impurities present in certain qualities of graphite, which can lead to generation of hydrogen at the cathode surface and, by admixture with chlorine, constitute a serious explosion risk.

The use of titanium for short connections to platinised titanium anodes avoids the possibility of corrosion at the joints and reduces to a minimum the voltage drop across leads.

Tests are in progress to evaluate the behaviour of titanium/platinum anodes in cells producing inorganic oxidising agents, including sodium chlorate, sodium perchlorate, sodium perborate and persulphuric acid.

Cathodic Protection. Laboratory tests lasting many months have been carried out on titanium with thin (0.0001 in. or less) coatings of platinum, operating in sea water or saturated sodium chloride at current densities of 200 amps/sq. ft. No case of failure occurred and there was no measurable loss of platinum.

On a practical scale, these anodes are being used at Thames Haven, where 15,000 sq. ft. of steel piling is being protected by four small platinised titanium rod anodes 2 ft. long by $\frac{1}{2}$ in. diameter (compared with 60 ft. of $1\frac{1}{4}$ in. diameter rod in a more conventional material). These have been in operation for six months at current densities varying from 68 amps/sq. ft. at hide tide to 46 amps/sq. ft. at low tide. Voltage has remained constant at 23 volts throughout. This test shows that platinised titanium electrodes can be successfully employed even in polluted estuarine water.

Although it is practicable to design an electrode system to operate at 200 amps/sq. ft., there is in practice an economic limit to the current density which is used. Present indications are that the economic range for platinised titanium anodes lies between 25 and 75 amps/sq. ft., which represents a considerable advance over other materials. By correct design within this range, the cost of anodes is comparable with, or less than, that of the more common materials.

Electrodialysis. In producing fresh water from brackish or sea water by electrodialysis it has previously been necessary to use different metals for the anode and the cathode. These electrodes tend to corrode and corrosion products may contaminate the ion exchange membranes.

Trials have now been made with platinised titanium used for both anode and cathode, current being reversed periodically to facilitate removal of any deposits on the membranes. Because of their corrosion resistance, these show none of the disadvantages of other metal electrodes.

Sodium Hypochlorite. In the electrolytic processing of sea water or brine to produce sodium hypochlorite for sterilisation purposes, platinised titanium electrodes show distinct advantages. When graphite is used, surface disintegration makes necessary periodical machining of the electrodes and consequent adjustment of the gap between them.

Chlorine Concentrations Greater

Platinised titanium electrodes require no such treatment and the gap remains constant. As with electrodialysis plant, platinised titanium can be used for both anodes and cathodes provided that the current is reversed at regular intervals to remove cathodically-deposited salts. Trials indicate that in these conditions a greater concentration of chlorine can be achieved at a higher electrical efficiency and with a saving of as much as 50% in salt electrolyte. In addition, much smaller units can be designed by utilising titanium electrodes.

Electro-descaling and Electro-galvanising. Because it is not subject to metal loss, platinised titanium may offer useful advantages over other non-consumable anode materials in cathodic descaling equipment for cleaning wrought stainless steel in acid media, and in the electro-galvanising of carbon steel wire in sulphuric acid/zinc sulphate electrolyte.

Separation of Colloids. Electrophoretic techniques for the separation of colloids are at present used only on a laboratory scale because the platinum wire electrodes needed for this process are so costly. The advent of platinised titanium, an electrode material with all the characteristics of platinum but without its cost disadvantage, opens up new possibilities for the employment of electrophoresis on an industrial scale.

Rhodium Plating Equipment. Another promising outlet for platinised titanium as a much cheaper substitute for wrought platinum is as anodes in rhodium plating baths. Experience has shown that, with the composite anode, while there is less evidence of gassing on the cathode surface, gas evolution at the anode occurs more readily. As a result, rhodium plating operations are carried out more efficiently and throwing power appears to be improved.

★ BREAKDOWN of the free trade area negotiations is bound to lead to a number of tie-ups between U.K. companies and those working in similar fields within the Common Market countries. Probably one of the first is the announcement of British Industrial Plastics and Algemene Kunstzijde Unie (A.K.U.) that they will set up a joint subsidiary in the Netherlands to manufacture urea formaldehyde and melamine formaldehyde moulding powder and resins for sale in C.M. countries.

The new company will give B.I.P. a firm foothold in the C.M. area allowing their products to compete on equal terms. A.K.U. have been extending their product range outside man-made fibres and have a large interest in plastics materials.

While on the subject of the C.M., I am surprised to learn that although the treaty came into effect this week, many of the technical sub-committees whose job it will be to work on matters of transport, packaging, etc., have yet to be appointed. I cannot help wondering whether discussions on the C.M. governing body will become as acrimonious as have executive meetings of the European Coal and Steel Community!

★ HINT of new products from the Kingsway Works of Laporte Chemicals came from an after-dinner speech by Mr. P. D. O'Brien, chairman, at the recent dinner of the Luton Works committee. Mr. O'Brien said that since their meeting a year ago, two tangible propositions had materialised for making new products there. Despite the fact that the suitability of the site for making chemicals was now restricted, there were many products which could still very suitably be produced there. Two products were under consideration and they 'would fit in with the type of site that it is'.

Referring to the more competitive times ahead, Mr. O'Brien said that five new hydrogen peroxide plants were being built in West Europe. He added 'I'm very glad we have built our A.O. plant'. He did not visualise bad times ahead, but he did visualise a fight and said 'I am rather looking forward to it'.

On an earlier occasion at Luton, Mr. P. D. O'Brien received a gold watch from his father, Mr. L. P. O'Brien, chairman of Laporte Industries Ltd. to mark his 25 years of service.

★ NEW uses are continually being found for plastics and one that interests me is the employment of Monsanto's Lustrex polystyrene on the St. Albans-by-pass, part of the new London-Birmingham motorway. Shuttering lined with polystyrene sheet has been used to cast eight concrete columns that will form the centre support of an overbridge carrying the new by-pass over the St. Albans-Watford road.

Lustrex-lined shuttering was first used last year in the construction of flats at Bristol. This proved so successful that when Holland and Hannen and Cubitts, who built the flats, were awarded the contract for bridges on the by-pass, they decided to use it again. Each of the eight columns measures 14 ft. high, 4 ft. 6 in. in diameter and contains more than 10¼ tons of concrete.

Monsanto's applicational research team helped in developing the technique. Twenty-four hours after filling the shuttering with concrete, the two halves of the heavy wooden frame were removed to reveal a perfect concrete column with an unusually glossy finish. The use of 0.060 in. thick polystyrene lining prevented the lines and blemishes sometimes caused by unlined wooden shuttering.

★ ON 4 January, 19 undergraduates will begin a week's vacation course with Pfizer of Folkestone and Sandwich, Kent. At the end of it they will tell senior executives of the company what they think of the firm and its activities. Frank discussion will be encouraged. Undergraduates reading for arts as well as scientific degrees are included.

Aim of the scheme, which is supported by the University Appointments Boards, is to provide general background experience of the chemical manufacturing industry. The students will tour the plants and laboratories at Folkestone and Sandwich, meet production, research and sales staff, and obtain as much information and advice as possible from department heads.

Typical subjects they are to study and later discuss are the functions of production control, the work of a project engineer, and how to launch a new product. All undergraduates selected for the course are in their final year and will shortly be taking up a career.

★ IN ORDER to consider the possibility of identifying and establishing standards of purity on an international basis for commonly-used chemicals which are added to many foods, the United Nations' Food and Agriculture Organisation and the World Health Organisation expert committee on food additives have recently held a joint meeting in Rome. I gather that the joint committee has started to draw up provisional specifications for a number of the more important food additives, with special reference to antimicrobial preservatives (used in fruit juices, jams, etc.) and antioxidants (used for the stabilisation of fats and oils).

In due course these specifications will be submitted to appropriate regulatory agencies, industries or individuals requesting them. They will include the chemical name and popular synonym of each substance, its description and chemical or structural formula, the percentage of each compound, proposed identification tests and acceptable standards of purity.

These specifications will serve as useful references for regulatory purposes to meet health requirements and protect the consumer against possible noxious products. They will also be valuable to the chemical industry in ensuring a satisfactory degree of reproducibility and of conformity to criteria of quality.

★ UNLIKE the first, the second remote controlled Biazzi nitroglycerine plant to be started up by the I.C.I. Nobel Division does not use television cameras to scan the process. The new plant, commissioned last month, employs a high-grade optical system of mirrors and lenses acting on the periscope principle. Operators in the remote control room can view the top of the stainless steel separating vessel and other given points in the nitrating room. The image is well-defined and bright.

The advantage of having alternative viewing systems is that it will be possible to compare their relative efficiency and maintenance costs. As in the first plant, the system was evolved by a Nobel Division team of engineers and physicists in close co-operation with the Biazzi company of Switzerland.

The equipment of the new plants is broadly similar to that which has worked well for more than a year. Some modifications have been made in the remote control system as a result of the first plant's working, the main one being in the method of direct viewing.

★ A NEW process for improving the surface appearance of plastics sheet is referred to briefly in *Lead News* (No. 6), the journal of the Lead Development Association, 18 Adam Street, London W.C.2. The extrusion or rolling of a heated thermoplastic or casting solutions on to belts or rollers do not always produce a sheet of uniform appearance.

An effective process developed involves subjecting the sheet to pressure and immersing it in a bath of molten metal. Metals which can be used include lead, plumber's solder, a eutectic alloy of lead tin and cadmium, mercury, tin, and bismuth amalgam.

In this process thermoplastic sheet is drawn continuously under tension round a number of rollers immersed in a bath of molten metal, maintained at a temperature sufficient to effect softening. Materials treated in this way include cellulose acetate, cellulose butyrate, ethyl cellulose, p.v.c., vinyl acetate, polystyrene and polythene.

Alembic

NEW LABORATORY APPARATUS SHOWN AT MANCHESTER SECTION R.I.C. EXHIBITION

THE exhibition of laboratory apparatus and techniques held during December at the Manchester College of Science and Technology by the Manchester Section, Royal Institute of Chemistry, again marked the debut of many new instruments. Some of these are briefly described below.

Baird and Tatlock (London) Ltd. introduced a number of instruments including their chromatographic desalting apparatus, designed to remove inorganic salts from solutions which are to be separated by chromatography. The method is said to give a better recovery of arginine than the mercury type. There is no temperature rise of solutions during desalting. Perspex cells, virtually unbreakable, permit the solutions to be observed at all times. The cell unit can be lifted clear of the instrument to facilitate filling and emptying. Membranes are said to have a life of not less than one year of continuous use and to be relatively cheap.

Donald Brown (Brownhall) Ltd. showed their newly developed combination standard and vacuum pump. Said to be the only one of its kind in the world, it will sell at about 128s. 6d.

Ralph Cuthbert Ltd. demonstrated a new model of their laboratory scaffolding which incorporates several new features.

Electrothermal Engineering Ltd. showed for the first time in the U.K. their electrically heated melting point apparatus which gives reproducible readings to ±1° at a rate of heating up to 5°C per minute.

Griffin and George Ltd. exhibited their new skeletal atomic models designed to demonstrate molecular structure, elucidation of chemical structure and steric configuration of dyestuffs, etc. The models, which are in kit form, have flexible bonds fitted with special self-gripping metal ends. Easy to insert and remove without special tools, they provide stable models.

Hudes Merchandising Corporation Ltd. had the new Sartorius rapid weighing precision balance Kilomat flown to this country for the exhibition. Designed for the rapid weighing of all kinds of substances, it provides for the reading of scale values on a screen as soon as the sample is placed on the pan. With an optional electrical supply from 100 to 200 volts a.c., it has a capacity of 3,000 g., an optical range of 1,000 g., and scale divisions of 1 g.

A. M. Lock and Co. Ltd. featured a new single rod, robust pH electrode which will stand longer usage compared with an earlier plastics-sheathed type.

Orme Scientific Ltd. displayed their new porcelain stirrer paddles for the first time in this country. They are particularly suitable for use with divisible vessels.

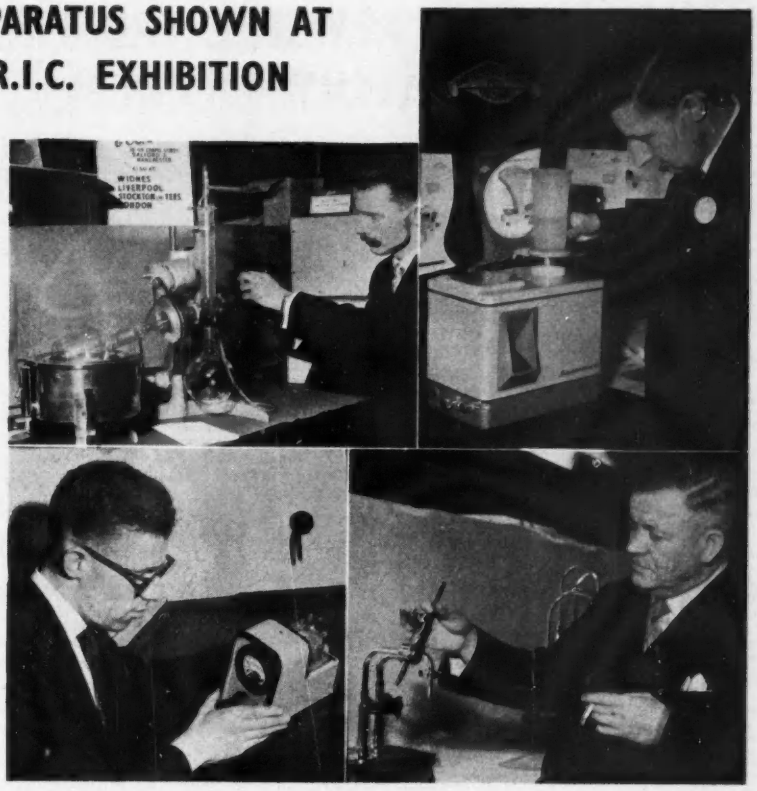
Pyrometric Equipment Co. Ltd. demonstrated their muffle-wound ash furnace. The door is constructed to give a continuous air flow through the furnace to which a chimney is fitted. Chamber size is 10 in. by 7 in. by 4 in. and maximum temperature obtainable is 1,000°C.

Quickfit and Quartz Ltd. featured their new progressive range of Quickfit assemblages, which should interest chemical laboratories and research stations in all sections of industry. The price range of the equipment contained is from 42s. to £57 10s.

The Thermal Syndicate Ltd. had on display three types of fused quartz springs used as microbalances in conjunction with a travelling microscope, for weighing fibres. Said to be corrosion-free, the springs are not subject to fatigue or elongation under excessive loading. A special feature was made of the recently developed fused silica and a unique ball-joint made from quartz.

J. W. Towers and Co. Ltd. showed their fixed-condenser rotary film evaporator, believed to be the first of its kind to be produced commercially in the U.K. Designed either for batch operation or

(*Continued at foot of next page*)



L. to r., top: D. G. Flint shows the new Towers rotary film evaporator; H. A. Kamm demonstrating the new Sartorius rapid weighing precision balance; below: A. F. Wilson (B.T.L.) with the new chromatographic desalting apparatus; and A. Griffiths (Donald Brown) showing the new combination water standard and vacuum pump

A. Carling of Griffin and George (left), demonstrates the new skeletal atomic models. Right: E. L. Curtis, of Electrothermal Engineering, with the new melting point apparatus

INCREASING REVENUE FROM N.R.D.C.'s PATENT LICENCES

INVENTIONS taken up by the National Research Development Corporation and licensed to industry are noted in the ninth report and statement of accounts (for the year 1 July 1957 to 30 June 1958) as bringing in a growing revenue which amounted to £174,242 in the year under review. Goods made under licence from the Corporation now amount to an annual total of 'many millions of pounds'.

Computor licences. The N.R.D.C. has followed a policy of building up its holdings of computor patents and patent applications from all sources, and currently holds a total number of patents and applications in the U.K. concerned with computors in excess of 200.

Diffraction grating. Work at the National Physical Laboratory on Sir Thomas Merton's/N.P.L. diffraction grating inventions has continued during the year under review. Prospects of a commercial return on N.R.D.C. expenditure on this invention are stated to have improved.

Tritium-labelled Aldosterone

Tritium-labelled aldosterone. The decision to produce a limited quantity of tritium-labelled aldosterone led to the simultaneous production of a number of other known but tritium-labelled adrenal hormones. The N.R.D.C. in collaboration with the Medical Research Council and Radiochemical Centre of Atomic Energy Authority is arranging for the allocation and distribution of a portion of these materials to research workers, and proposes to sell the balance the potential commercial value of which is high.

New œstrogen. A new orally-active oestrogenic hormone, 'Miroestrol' has now been extracted from *Pueraria mirifica* at the Sondes Place Research Institute. The structure of this oestrogen has been determined using X-ray crystallographic analysis with computor aids at Oxford University. The high oestrogenic activity claim was confirmed at the National Institute for Research in Dairying in collaboration with Middlesex Medical School.

Selective weedkillers. Professor R. L. Wain of Wye College, while carrying out an academic study with the help of the Agricultural Research Council upon the mode of action of so-called 'hormone' weedkillers, discovered that certain phenoxybutyric acid derivatives possess exceptional properties; they are relatively non-toxic to a number of broad-leafed plant crops hitherto sensitised to the hormone weedkillers, and thus exhibit an enhanced selectivity which is proving of value in agriculture. U.K. companies, the N.R.D.C. report, are actively promoting the compounds under licences from the corporation, both at home and overseas. Satisfactory licensing arrangements have been set up in the U.S. and U.S. Food and Drug Administration approval is in sight.

Development Projects: acetylene synthesis. The small laboratory at the Mogden Drainage Works of the West Middlesex County Council which is being set up to permit the burner system developed at Imperial College to be tested with a steady supply of methane from the works in order to evaluate the burner and its suitability for use in an appropriately designed gas turbine, is on the point of completion.

Hydrogen-oxygen fuel cell. Development work on this project is stated to have continued with generally satisfactory results. The N.R.D.C. has made an agreement for collaboration and interchange of rights with one of the groups working in the U.S. The agreement provides for manufacture by the U.S. group concerned under licence from the N.R.D.C.

Ion-exchange membranes. Good progress has been made by the research team at the National Chemical Laboratory in conjunction with the Low Temperature Research Station and Sondes Place Research Institute in the development of a satisfactory cation membrane and work is now proceeding for the development of an anion membrane. A number of worthwhile industrial applications have been identified for the electrodialysis cell when the membrane aspect has been satisfactorily resolved.

B.R. Will Open New Chemical Research Centre At Muswell Hill In Late 1959

NEW chemical laboratories being built for the British Railways Research Department, on a site near the former Alexandra Palace Station at Muswell Hill, London, will enable certain chemical work now being conducted at various laboratories, to be concentrated and co-ordinated at one centre. A contract has been placed for the construction of the building, and work is in progress. It is expected that the new laboratories will be completed by the end of 1959.

The demands on the chemical services of the B.R. Research Department have increased considerably, particularly as a result of the railway modernisation programme, and the existing laboratories in the London area which are widely dispersed, are obsolete and inadequate for present and future requirements. It was therefore decided to build a new chemical research centre which would provide modern laboratory facilities and allow the work to be carried out in one establishment. The Muswell Hill site was selected for the new building as land was available, and the area is free from vibration and industrial atmospheric pollution.

The new building will house the headquarters of the chemical services of British Railways, and the laboratory accommodation will include an area chemical laboratory which will provide a general chemical service throughout East Anglia and within a radius of some 50 miles around London for such matters as the examination of materials to ensure that they meet specifications, the examination of waters, oils, etc., and chemical work associated with claims for damage. This will replace the obsolete premises at Stonebridge Park, and will obviate the rehabilitation of a former laboratory at Stratford.

Other buildings comprise a building materials laboratory to expand the research work of a small laboratory at Wimbledon, which will be closed; a research laboratory where chemical investigations will be conducted; and a corrosion laboratory concerned with research problems, such as combating corrosion in the cooling systems of diesel locomotives, and the protection from atmospheric attack of the supporting structures used in railway electrification on the overhead system. This laboratory will replace a small and inadequate one at Derby.

Manchester Exhibition

(*Continued from p.* 11)

continuous feed, it utilises the principle of spreading a thin film of solution over a large area, at reduced pressures. The new Towers Labjack was also on show.

Townson-Mercer Ltd. showed their newly modified thermostat vacuum oven which has a glass door for full vision. Two vacuum taps are fitted as standard and the ovens have a large throughput of pre-warmed air. They can be fitted with automatic boost control, giving an extremely quick warm up, and automatic stabilisation at required temperatures, the maximum temperature now being 150°C.

A new nitrogen estimation apparatus was displayed by the *Loughborough Glass Co. Ltd.*, Loughborough. The apparatus enables reactions to be conducted on the laboratory bench without the use of a fume cupboard or any additional equipment.

The Tintometer Ltd., Waterloo Road, Salisbury, displayed a range of standard colour measuring instruments, including the new Lovibond Schofield Tintometer, a general visual colorimeter for solids, liquids or pastes. It is particularly suitable for measuring the colour of light sources. New additions to the range of chemical analytical tests for the Lovibond comparator include oxygen in low concentrations for boiler feed water analysis and nitrate estimation for controlling brine baths in meat processing.

I. CHEM. E. PAPER ON LIQUID DISTRIBUTION IN GRID PACKINGS

Part II: Evaluation of Packing Constants

OBJECT of the work described in Part II of the paper on '*Liquid distribution in grid packing*' (Evaluation of packing constants), by Dr. J. W. Mullin, Department of Chemical Engineering, University College, London, presented to the meeting of the Institution of Chemical Engineers on 17 December, was to test the validity of the theoretical equations when applied to actual grid packings. The relative relationships are:

$$C = \frac{d}{(1.5t - 0.053s - 0.05)s^2} \quad \ldots\ldots (1)$$

$$C = \frac{d}{(t)_s^2} \quad \ldots\ldots (2)$$

$$C = \frac{d}{(1.5t - 0.053s + 0.2)s^2} \quad \ldots\ldots (3)$$

$$C = \frac{d}{(t + \tfrac{1}{2})s^2} \quad \ldots\ldots (4)$$

[See Part I, 'Mechanism of liquid-spread,' C.A., 27 December, p. 1057.)

Wooden Grid Packings. Distribution of water through six different grid packings was measured. Four of the packings were made of wood and two of carbon. Packing A (and also Packings B and C) were installed in an 18 in. square tower equipped to operate as an experimental cooler. Packing D formed part of a 4 ft. square commercial water cooler while packings E and F were constructed as laboratory scale models.

Packing A. This consisted of 16 rough-surfaced wooden slats 9/32 in. thick, 17½ in. long, 1¼ in. deep and spaced apart in the grids by 3 rows of wooden blocks. Mean pitch of the slats in the grids was about 1 1/16 in.

Water Rates

Water rates from the single distributor ranged from 350 to 1,100 lb./h. in a packed height of 2.48 ft. (17 grids). Each distribution curve was found to exhibit two peaks, the central peak directly above the feed point and the smaller right-hand peak above a collector (No. 9) caused by a modern spacer block which deflected water away. These curves, in spite of their irregular shapes, were approximately Gaussian in form, and packing constants as defined in Part I, could be calculated.

The quantity $k\sqrt{\pi}/h$ for a Gaussian should be unity, and for the results obtained with a packed height 2.48 ft. the value of C was between 0.37 and 0.38. C remained fairly constant at about 0.38 for a number of runs over the flow range 350 to 1,100 lb./h., and this value compared with the theoretical value of 0.41 calculated from equation (1).

Packings B and C. More accurately constructed than packing A, each grid contained 16 slats of planed wood, 17½ in. long and 1¼ in. deep. The slats were accurately pitched at 1 in. and held in position in each grid with bitumen on two 3/16 in. dia. steel rods. Slats of packing B were ¼ in. thick, while those of packing C were 5/16 in. As in the case of packing A, water was collected off each slat in the bottom grid by 16 narrow troughs. Packed height was 2.7 ft. (26 grids).

Values of C, calculated as for packing A, varied from 0.43 for the lowest flow rate (250 lb./h.) to 0.34 at 400 lb./h. and then remained fairly constant between 0.33 and 0.34 up to the maximum flow rate used (1,200 lb./h.). This latter value compared with the value of 0.38 calculated from equation (1).

'Runs' with Packing

A number of runs were carried out with packing C using water rates ranging from 250 to 1,200 lb./h. with Z equal to 2.7 ft. For water rate from the line distributor in excess of 500 lb./h. the value of C remained fairly constant at about 0.27. This compared with a value of 0.29 calculated from equation (1). For water rates less than 500 lb./h., C increased sharply to 0.42 for a rate of 250 lb./h.

Effect of Packed Height: It was confirmed experimentally by carrying out a few distribution measurements in a shorter depth of packing than that used alone that C was independent of Z. Values of C for the same flow rate (600 lb./h.) in two different packed heights (1.56 and 2.7 ft.) of packing B were 0.33 and 0.32 respectively. Packed height, Dr. Mullin stated, had no appreciable effect on the value of the packing constant.

Effect of Staggering Grids: As packings B and C were not serrated, it was suspected that even although the liquid spread might be improved by the use of a staggered arrangement, trouble might be encountered with droplet formation within the packing.

Results from a few runs were even worse than expected. The whole packing appeared full of streams of water dripping between slats and up to 30% of the total water flow missed the collectors. The spread of water was improved, but it was shown that staggering could not be employed with a plain packing. Because of the increase in liquid spread the effect of staggering in a serrated packing, in which droplet formation is rare, was tried.

Packing D: Each grid of this packing comprised 19 rough-surfaced slats ¼ in. thick, 3 ft. 2 in. long, 2 in. deep, pitched at 2 in., and serrated over the same distance. The 30 grids gave a packed height of 5 ft. Water was collected off each of the 19 slats on the bottom grid. Seven runs were carried with water rates ranging from 700 to 4,000 lb./h. For flow rates between 1,900 and 4,000 lb./h the value of C was 0.11, and this compared with a value of 0.10 calculated from equation (1). For water rates less than 1,900 lb./h., C increased until a value of 0.18 was obtained for a flow rate of 700 lb./h.

Carbon Grid Packings: *Packing E*: Each grid consisted of 8 carbon slats ¼ in. thick, 6 in. long, 1 in. deep, with 11/16 in. triangular serrations ½ in. deep, pitched at 11/16 in. and held in position by spacer bars. Erratic results were recorded due to lack of firm contacts between the slats. All that could be said of the results was that C had a value of about 1.4 over the flow range 30 to 90 lb./h. compared with a value of 1.77 calculated from equation (1).

Effect of staggering the grids with this packing caused the peak of the distribution curve to be flattened and allowed a slightly greater extent of spread. Packing constants could be calculated to be about 1.4 for the normal arrangements and about 0.5 for the staggered case. The value of 0.5 is the same as calculated from equation 3. A staggered arrangement of a serrated grid packing was therefore a useful method for increasing the liquid spread.

Packing F: The carbon slats in this packing were 12 in. long, 1 in. deep, 3/16 in. thick, with ¼ in. triangular serrations 3/16 in. deep in their bottom edges. Packed depth was 18 in. Each grid contained 16 slats held in place by two spacer bars. As the bottom serration points on the slats were sharp, the same trouble as described on packing E was experienced initially. Even with the sharp points ground flat only partial success was achieved.

Contact Not Good

Between water rates of about 250 to 500 lb./h. C remained fairly constant at about 0.55, but for flow rates less than 250 lb./h., C increased rapidly reaching a value of 1.3 at a rate of 63 lb./h. C = 0.55 in the steady range compared with a value of 0.78 calculated from equation (1). The poor agreement indicated that the contact between the grids was not good.

Several runs were carried out with packing F in a staggered arrangement. As with packing E, staggering resulted in a greater spread of water in packing F. For water rates in excess of about 200 lb./h., the value of C was between 0.38 and 0.41 compared with a value of 0.3 calculated from equation (3). At water rates below 200 lb./h. the spread of water was reduced and the value of C increased until a value of 0.74 was obtained at a flow rate of 61 lb./h.

For a normal grid packing arrangement, the experimental values of C were, with the exception of that for packing E in good agreement with those calculated from equation (1). Equation (2) although only approximate, is stated to be useful

for predicting the order of the liquid spread; its value lies in the fact that it is much less cumbersome to use than equation (1).

The values of C are substantially constant only over the flow ranges indicated. At lower flow rates, C increases sharply; at higher flow rates C decreases slowly due to over-loading of water at the feed point and possibly within the packing itself.

For a staggered serrated-grid packing, the liquid spread was improved, stated Dr. Mullin, as predicted by equation (3). Comparison of experimental values of C with those calculated from the more simple equation (4) was also good.

Effect of Counter-current Air on Liquid Spread: A number of runs were carried out with several grid packings with and without counter current air. It was found that countercurrent air had little effect on the distribution of water through a grid packing.

Liquid Mixing in a Grid Packing: Although it would appear reasonable to expect a considerable amount of mixing of water within a grid packing operating with a number of liquid distributors, this is found to be contrary to the results obtained from the single-slat distribution work described in Part I. It was concluded that the pattern of flow distribution was reached by an equalisation of the top-edge layer flows and not by any appreciable transfer between the two opposing layers. It was also suggested that although the concept of a packing constant C could give a measure of the spread of liquid through a packing, it might not give any indication of the degree of liquid mixing within the packing.

From experiment it was determined that the spread of water from one distributor operating alone was greater than the spread from the same distributor when all four distributors were operating. At total flow rates around 2,000 lb./h. ft.^{2} this confinement of liquid coming from one particular distributor was stated to be quite marked.

Apart from a slight smoothing-out of the distribution curves, the flow patterns obtained when counter-current air flowed up the tower was almost identical to those obtained when no air was used. Within the ranges tested, therefore, air flow had little effect on either the liquid distribution or the liquid mixing in a grid packing. It was observed, however, that mixing increased considerably under conditions of loading, but no quantitative measurements were made.

Symbols used.

C = the packing constant (ft./in.^{2})
d = depth of a slat (ft.)
s = pitch of the slats in a grid (in.)
t = thickness of a slat (in.).

Dr. Linstead Receives Knighthood in New Year Honours List

ONE of Britain's leading organic chemists, **Reginald Patrick Linstead,** C.B.E., M.A., Ph.D., B.Sc., A.R.C.S., F.R.I.C., F.R.S., rector of the Imperial College, London, has been awarded a knighthood in the New Year Honours List. Research assistant to Sir Jocelyn Thorpe in 1927, he became a research chemist with Anglo-Persian Oil Co. in 1928 and was demonstrator and later lecturer in organic chemistry at the Imperial College from 1929 to 1938; from 1938 to 1939 he was Firth professor of chemistry, Sheffield University; professor of organic chemistry, Harvard University, 1939 to 1942; deputy-director of scientific research, Ministry of Supply, 1942-1945; director of the D.S.I.R. Chemical Research Laboratory, 1945-49; professor of organic chemistry and director of the organic chemistry laboratory, Imperial College, 1949-54; dean of the Royal College of Science, 1953-54. He is a former vice-president of both the Chemical Society and of the Royal Institute of Chemistry.

KNIGHTS

Other knighthoods have been awarded to **Douglas William Logan,** principal of the University of London, and to **Kelvin Tallent Spencer,** C.B.E., M.C., B.Sc., M.I.C.E., F.R.Ae.S., chief scientist, Ministry of Power, since 1954.

C.B.

William Brian Littler, M.Sc., Ph.D., director-general of scientific research (munitions) Ministry of Supply since 1955, was a Bayer fellow at Manchester University in 1930-31. He joined the research department, Woolwich, in 1933 and was loaned by the Ministry of Supply to the Defence Research Board, Canada, as chief superintendent, Armaments Research and Naval Development Establishment, Valcartier, Quebec, 1947-49.

C.M.G.

Clifford Waite, chairman and joint managing director, Consolidated Tin Smelters Ltd.

C.B.E.

Stanley Edward Clotworthy, managing director, Northern Aluminium Co. Ltd.

Maurice Cook, Ph.D., D.Sc., chairman of I.C.I. Metals Division, Birmingham. Chairman of the British Non-Ferrous Metals Research Association, he is a past president of both the Institute of Metals and the Institution of Metallurgists.

Thomas Campbell Finlayson, chairman of Woodall-Duckham Ltd.

Paul Thomas Fletcher, B.Sc., deputy managing director, U.K. A.E.A. Industrial Group, Risley, near Warrington.

Walter Thomas James Morgan, D.Sc., Ph.D., F.R.I.C., member of Ministry of Supply Biological Research Advisory Board, and professor of biochemistry, London University. He is also deputy director of the Lister Institute of Preventive Medicine.

Reginald John Pinder, managing director, Esso Petroleum Co. Ltd.

O.B.E.

Louis Essen, senior principal scientific officer, D.S.I.R. National Physical Laboratory, Teddington.

Frank Cook Everett, principal scientific officer, Ministry of Supply Armaments Production Division.

John Morrison Hay, senior principal scientific officer, Ministry of Agriculture, Fisheries and Food, Research Establishment and Experimental Factory, Aberdeen.

Charles Vincent Hill, M.C., lately refining adviser, British Petroleum Co. Ltd.

Peter William Mummery, senior principal scientist, U.K. A.E.A., Reactor Division, Atomic Energy Research Establishment, Harwell.

Shirley Percival Stotter, lately director, Fernhurst Research Station of Plant Protection Ltd.

M.B.E.

Ronald John Bracey, lately head of the optics department, British Scientific Instruments Research Association.

James Cooper Evans, area production manager, Marchon Products Ltd., Whitehaven.

Ian Henry Hogg, a senior research planning officer, U.K. A.E.A., Industrial Group, Research and Development Branch, Risley, near Warrington.

William Manson, experimental officer, D.S.I.R., Edinburgh Office, Geological Survey and Museum.

Walter Robert Alfred Dennis Moore, B.Sc., Ph.D., F.R.I.C., reader in high polymer chemistry, Department of Chemical Technology, Institute of Technology, Bradford. He was formerly senior lecturer in physical chemistry.

Percy Charles Ruggles, senior engineer, English Electric Valve Co. Ltd.

William Hall Simmons, chemist II, Royal Ordnance Factory, Bridgewater, Somerset.

Charles Stamps, shops superintendent, Dorman Long (Chemicals) Ltd.

Polish/U.K. Trade in Chemicals to Increase in 1959

Negotiations between representatives of the Governments of Poland and the U.K. have resulted in the drawing up of quota lists covering U.K. exports to Poland and Polish exports to the U.K. during 1959. These provide for increased U.K. exports to Poland during 1959 of chemicals, manufactures of rubber, etc. The new quota lists also provide for increased Polish exports to the U.K. of chemicals.

First Comprehensive U.K. Industry Exhibition in New York

The first comprehensive all-British exhibition ever held in the U.S. is scheduled for June 1960 in New York. It will occupy all four floors of New York's Coliseum, over 390,000 sq. ft. of space. Americans will be able to see under one roof a wide range of British industrial products. In addition to the industrial sections, there will be a prestige display organised by the Board of Trade.

Analytical Review

ANALYSIS OF NUCLEAR REACTOR COOLANT GASES

DETECTION and determination of small concentrations of permanent gases in carbon dioxide used as a coolant gas in nuclear reactors has recently been investigated by Timms, Konrath and Chirnside[1]. These workers have shown how gas chromatography can be used in place of the relatively more expensive technique of mass spectrometry to solve this problem. The technique involved differs somewhat from conventional vapour-phase chromatography in that the principle of partition which is used in the latter is replaced by adsorption of the required gases on a suitable material and either displacement or elution by a suitable carrier gas.

Janák[2] in Czechoslovakia has carried out extensive experiments in which he used carbon dioxide as the carrier gas to elute other gases adsorbed on silica gel, alumina or activated charcoal. The desorbed gases were determined in a nitrometer over strong caustic potash. While the activated charcoal absorbent appears to have been the best, its efficiency for the permanent gases leaves much to be desired. Timms, Konrath and Chirnside have now used molecular sieve to retain and separate traces of hydrogen, oxygen, nitrogen, methane, argon and carbon monoxide in carbon dioxide. Since strongly polar molecules such as water and carbon dioxide are strongly retained by the sieve, these were first of all removed by passing the gas stream through anhydrone and soda asbestos.

Displacing Retained Gases

The retained gases were displaced (eluted) from the sieve by means of high purity argon or hydrogen. When argon was used, hydrogen, nitrogen, methane, oxygen and carbon monoxide were readily separated and detected. A higher sensitivity was obtained with hydrogen as carrier gas but the oxygen and argon then appeared as a single peak on the recorder chart. The argon analysis could therefore be obtained by difference between the two methods or alternatively by another method in which the oxygen was removed by 'De-oxo' catalyst immediately after separation of the carbon dioxide.

The apparatus used by these workers incorporated two 20 s.w.g. interchangeable stainless steel tubes (6 ft. long, ¼ in. external diameter) maintained at a temperature of 100°C; a thermal conductivity cell was used for detection of the evolved gases. The optimum performance was obtained at a flow rate of 30-40 ml./min., and a complete analysis required about eight minutes. The method is an attractive alternative to the use of the mass spectrometer and will no doubt find application in spheres other than nuclear technology.

Chemical Analysis by Study of Reaction Mechanism. In the U.S., Blaedel and Petitjean[3] have undertaken the possible development of a generally applicable accurate yet rapid method for the analysis of organic compounds based on the measurement of the rate of reaction of the compound with a standard reagent. In the sphere of inorganic analysis similar procedures—mainly associated with catalytic activity—have been used for the submicro determination of several ions. Thus iodide can be determined by its catalytic influence on the reaction between Ce^{4+} and As_2O_3, Ag^+ by its similar action on the reaction between Mn^{2+} and $S_2O_8^{=}$, Cu^{2+} by its influence on the auto-oxidation of resorcinol.

By
T. S. WEST, Ph.D.

This article reviews (1) the analysis of impurities in carbon dioxide by a method which employs a gas chromatography column packed with molecular sieve and which uses a thermal conductivity cell for detection; (2) the analysis of organic compounds by measurement of reaction rates. It also discusses two recent review articles which relate to (a) spectrophotometric titration and (b) nucleation processes in the formation of analytical precipitates.

In organic chemistry, little use has yet been made of these phenomena except for qualitative purposes, e.g., differentiation of sugars by time of osazone formation and of organic halides by time of silver halide formation. In this new paper, the authors have made use of the technique of high-frequency conductance measurements to follow the course of organic reactions which proceed with a change in conductance when a known weight of the compound reacts with a standard reagent solution. The reaction vessel is situated so that it forms part of the tuned circuit of a high frequency oscillator. Changes in conductance are reflected by changes in the frequency of the loaded oscillator and this is measured by reference to a standard oscillator with the use of a frequency meter which produces a small d.c. signal proportional to the beat frequency. The amount of the reacting species in the original sample is then determined by referring the measured rate of frequency change to a working curve obtained with known amounts of the pure compound being determined.

Two reactions were studied: (1) the well documented alkaline hydrolysis of ethyl acetate and (2) the oximation of acetylacetone. The results obtained with ethyl acetate indicate that the accuracy and precision of the method for the analysis of single constituents in interference-free samples is good. The method could probably be applied successfully to binary mixtures. It is apparent, however, that it is potentially most useful in dealing with reactions which do not go to completion and it is here that it is likely to be most welcomed by organic chemists. Many organic compounds cannot be analysed easily for the simple reason that unlike inorganic compounds they do not react with added reagents to the extent of 100%. Thus acetylacetone reacts with the usual ketone reagent, hydroxylamine hydrochloride, even in the presence of pyridine to the extent of only 95.5% after two days.

When the method evolved for ethyl acetate was applied with suitable modification to this problem, results with an accuracy of about 0.3% were readily obtained.

Promising Principle

The measurements made in these two analyses were taken during the first 5 to 10 minutes after mixing, which demonstrates the possibility of speeding up 'slow' organic analyses such as the example mentioned above. The principle of the method is undoubtedly a promising one worthy of further investigation. The choice of the high frequency technique made by the authors is open to criticism on two grounds: (1) the non-linear response of the instrument and (2) the non-fundamental nature of the numerical data obtained. In addition, the apparatus itself, which consists essentially of two high frequency oscillators of high stability, is not easy to design or fabricate. However, this is a minor criticism for it was natural that the authors should use the high-frequency methods which they have developed extensively and, as they themselves point out, there is no reason why other instrumental methods, e.g., spectrophotometry, polarography, should not be used to follow the course of the reaction.

Spectrophotometric Titration Techniques and Nucleation Processes Reviewed. There has recently appeared a useful paper by Headridge[4], which is concerned with the applications of spectrophotometric technique to end-point detection. Titrations are classified according to the indicator system used: (1) Self-indicating systems, (2) Systems containing sufficient indicator to react with either all the titratable ion or the amount of reagent likely to be added beyond the equiva-

lence point, (3) Systems containing only small molecular proportions of indicator.

Within the first category, the author considers systems where either the titrant *or* the solute being titrated absorbs radiant energy of a selected wavelength. (This may be in the visible, U/V or near infra-red regions of the spectrum.) He also considers in this category, the heterometric, i.e. (turbidimetric) titration technique of Bobtelsky in which the end-point is marked by maximum turbidity as the titrating agent precipitates the ionic species being determined from solution. Most of the examples cited for category II are concerned with the use of EDTA for metals, e.g., bismuth or iron, in the presence of thiourea or salicylic acid respectively. Class III which is obviously the most common category includes acid-base, complexometric and precipitation titrations. The article also discusses sources of error, e.g., temperature effects, entry of extraneous light, volume corrections, etc., and it deals briefly with instrumentation and refers to papers concerned with the theory of titration.

The second review by Klein and Gordon[5] on nucleation during the formation of analytical precipitates is rather more fundamental in its approach. It shows how modern investigation has modified the classical empirical rules devised by Von Weimarn. Thus, although the slow addition of reagent as a very dilute solution under conditions of vigorous stirring is a basic rule for obtaining granular high purity analytical precipitates in most systems, it is not universal. In some instances better precipitates have been obtained by adding a concentrated reagent solution. In addition, stirring may be harmful because rupture of the primary crystals causes the formation of smaller final particles. These and many other factors are discussed lucidly and concisely in a paper which should be of considerable interest to all analytical chemists.

REFERENCES

1. Timms, D. G., Konrath, H. J. and Chirnside, R. C. *The Analyst*, 1958, **83**, 600.
2. Janak, J., *Chem.Listy*, 1953, **47**, 464, 817, 828, 837, 1184, 1190, 1348, 1476.
3. Blaedel, W. J. and Petitjean, D. L., *Analyt.Chem.*, 1958, 30, 1958.
4. Headridge, J. B., *Talanta*, 1958, 1, 293.
5. Klein, D. H. and Gordon, L., *ibid.*, 1958, 1, 334.

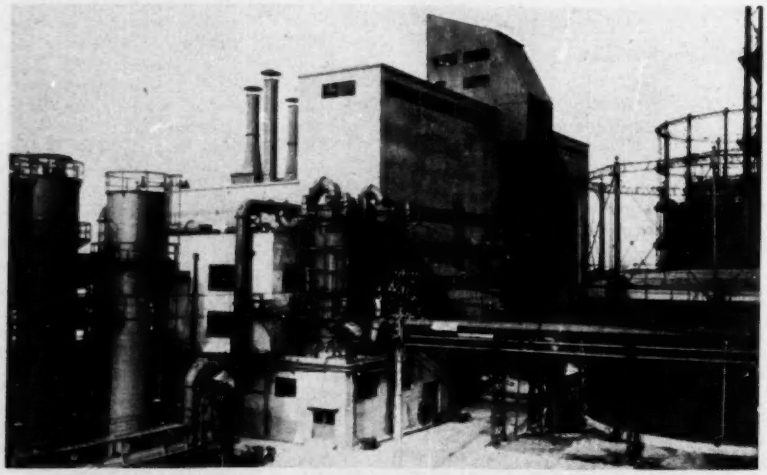
Power-Gas Jap Licensees to Supply Carburetted Water Gas Units

FOLLOWING a recent visit to Japan of Mr. E. Coates of the Gas Plant Division of the Power-Gas Corporation Ltd., Stockton-on-Tees, the company's licensees, Mitsubishi Chemical Machinery Manufacturing Co. Ltd., have received an order for three units of carburetted water gas plant to be installed at the Toyoshu Works of the Tokyo Gas Company.

Each of the three units will have a capacity of 6 million cu. ft. per day from coke and heavy oil feedstock, and will incorporate generators of the dry base type. Except for specialised equipment this plant will be manufactured in Japan.

Since 1954 the licensees in Japan of the Power-Gas Corporation have received orders for units with a total daily productive capacity of 116 million cu. ft. All of the larger units (18) incorporate generators of the dry base type and except for the small static generator units, all use heavy oil for enrichment, employing the chequerless carburettor, opposed oil injection, reverse flow system.

In addition, four mechanical producers have been installed each capable of gasifying 60 tons per day of coke.



The carburetted water gas plant at the Iwasaki works of the Osaka Gas Co. Four units, each with a capacity of 6 million cu. ft. per day have been installed

D.S.I.R. and National Library of Science

D.S.I.R. are to take over part of the Royal Ordnance Factory at Thorp Arch, near Boston Spa, Yorks, for the use of the new National Lending Library for Science and Technology. It is proposed that the library should begin operating in 1961 and become fully operational during the following year. The new library, the nucleus of which already exists in the D.S.I.R. Lending Library, Chester Terrace, Regents Park, London, will cover all subjects in science and technology except for some fields of medicine. It will take over the responsibility for the lending service now provided by the Science Museum Library, which in future will concentrate on serving the needs of the enlarged Imperial College of Science and Technology. It is also taking over some of the literature now held by the Science Museum Library. Apart from the National Library, there is also under discussion the National Reference Library of Science and Invention which it is proposed to establish in London as the successor to the existing Patent Office Library.

Sunvic Symposium on Process Instrumentation

A ONE-DAY symposium on 'Instrumentation in the process industries' was recently organised by Sunvic Controls Ltd., 10 Essex Street, London W.C.2. It was attended by more than 50 directors and executives from other companies in the A.E.I. group as well as from chemical and other companies. Symposium chairman was Mr. N. R. Davis, Sunvic managing director.

Five papers were delivered by Sunvic executives on techniques and applications of automatic control and instrumentation as now applied to processes involving continuous flow production particularly oil, chemicals and nuclear power and also surveyed future development and trends. Data processing and automatic computation were stressed, particularly in relation to possible applications in fully automatic plant control.

Teaching Laboratories for Chemical Engineering

During the ten years since the publication of 'Equipment of chemical engineering laboratories' the number of full-time courses in chemical engineering in this country has more than doubled and this has necessitated revising the pamphlet. The revised edition, 'Notes on laboratories for the teaching of chemical engineering' takes into account suggestions and ideas put forward by teachers and makes use of experience gained during the period of expansion. A broad outline on the design and equipment of teaching laboratories is given and copies may be obtained from the Institution of Chemical Engineers, 16 Belgrave Square, London SW1.

EQUIPMENT REVIEW

Chemical Plant: Laboratory Apparatus: Safety and Anti-corrosion Products

TRIANGLE C.I. GATE VALVE

ADDED to the range of valves produced by the **Triangle Valve Co. Ltd.**, 315 Regent Street, London W.1, is the Triangle cast-iron gate valve. This new valve, series 125, has body and bonnet with integral yoke in cast-iron to B.S. 1452, grade 14, a bolted body-bonnet connection, and outside screw and yoke. It is suitable for repacking under pressure when fully open and ends are flanged and drilled with smooth-face finish.

End flanges are linked to the cover flanges by a vertical rib and on the large sizes of valves, the elliptical valve chest is reinforced by horizontal ribs, to prevent distortion due to pressure and pipeline stresses. Ample clearance is provided for the removal of bonnet bolts and end flange bolts.

Class 125 valves are recommended for saturated steam service at 125 p.s.i. or liquid and gas at or near atmospheric temperature at pressures up to 175 p.s.i.

Also new is a range of parallel slide valves of the rising spindle, outside screw type with spring-loaded discs.

INDICATING TEMPERATURE CONTROLLER

NEW indicating temperature controllers have been introduced by the **British Rototherm Co. Ltd.**, Merton Abbey, London S.W.19. Two models are available: 1036, back flange and 1036/1, panel mounting. They comprise mercury-in-steel actuated 4 in. dial thermometer with control unit that has one temperature operated pointer and one or two adjustable pointers which can be set to 'make' and/or 'break'.

Any temperature range from −20°F to +1,000°F or equivalent °C, with minimum coverage of 50°F (30°C), can be provided. Standard bulb is mild steel, ¼ in. diameter screwed ¼ in. B.S.P. with copper-sheathed capillary. The black stove-enamelled case has an indicator lamp and an electric conduit entry.

NEW SMALL VERSATILE PUMP

A PUMP for delivering either a continuous or a broken flow of corrosive liquids has been developed by **Appleton and Howard Ltd.**, St. Helens, Lancs. The Minnow measures 7¼ by 3¼ by 5¼ in. and weighs 5¼ lb. It is of the centrifugal type complete with a direct mounted motor fitted with a guard. The pump components and the motor are held in a die-cast aluminium frame with support feet. It can, therefore, be mounted on bench, or panel, or incorporated in a packaged unit. The suction and discharge branches are suitable for ¾ in. bore rubber or plastics hose.

Pump body and impeller are of high density polythene and the shaft sleeve of high grade stainless steel, making the unit resistant to a wide range of corrosive fluids. The standard unit has a synthetic rubber lip-type shaft seal. Alternatively, a mechanical seal with stainless steel and carbon components can be fitted for a small extra charge. This resistance to corrosion makes the Minnow pump particularly valuable for general laboratory use or for pilot plants. The great diversity of fluids that can be handled and the compact size and light weight, make the unit of interest to all manufacturers who require a continuous flow of liquids either as constituents or as coolants. The rate of flow for fluids of similar viscosity to water at normal ambient temperature is 5 g.p.m. against a head of 2 ft., or 1 g.p.m. against a maximum head of 11 ft.

The complete unit sells at £5 15s. each. Alternative material can be used in construction.

THERMOMETER COMPENSATED FOR 'CREEP'

COMPENSATED against 'creep' due to the case heating or cooling, the new Clyde V.B. industrial dial thermometer is manufactured by **Buchanan Brothers Ltd.**, 80 Commerce Street, Glasgow C5. The latest models are fitted with the company's new Easiread scale which enables readings to be taken at considerable distances. The thermometer consists of a bi-metal element which operates through a movement. By means of this movement the instrument can be calibrated accurately over its entire range.

No glass is used on the V.B. thermometer. Dial gauge measures 3 in. in diameter. Standard ranges available are 0-300°F and 40-240°F; 0-160°C and 10-120°C. Delivery of standard instruments having a tail length of 2½ in. below the hexagon is ex-stock. Price is 36s each.

REMOTE CONTROL PUSH BUTTON EQUIPMENT

A NEW, adaptable range of remote control push button equipment has been introduced by **Dewhurst and Partner Ltd.**, Inverness Works, Hounslow, and is now available on an ex-stock basis under the name of Dupar unit system. Many different components such as push buttons, switches, round or rectangular indicator lamps, auxiliary contacts and audible indicators can be fitted into a control box of appropriate size. One of the features exclusive to this system is the large selection of faceplate materials available as standard.

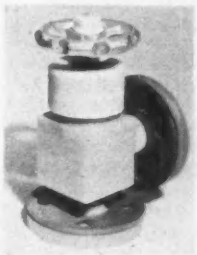
Four main types of control box are available in, at present, a total of 25 standard sizes. Briefly the four types are: (a) A pressed steel box with die cast ends suitable for all general purposes where a flush fitting faceplate is required; (b) a one-piece cast box fitted with oil seals, for use with oiltight components and a flush fitting faceplate; (c) a surface mounting type for industrial or other uses, where a strong, compact, enclosure is required; (d) a similar to (c) but oiltight.

Many of the basic components of this range have been in use for a number of years as individual items in conjunction with the control desks and panels. Only now has the range been made separately available on an ex-stock basis as part of a definite and flexible combination system offering every advantage for the proper selection of equipment for any particular application.

NEW FINE-ADJUSTMENT VALVE

RECENTLY introduced by **Chemical Pipe and Vessel Co. Ltd.**, Godstone Road, Kenley, Surrey, is a fine-adjustment valve, in plastics material, with a Fluon seat. It can be used for all corrosive liquids up to 65°C.

It is an addition to the range of corrosion-resisting valves, up to 2 in. bore, manufactured by C.P.V. These valves are available in flanged ends and, to a smaller extent, in socket ends for welding into low-pressure lines. The range includes fine-adjustment valves, pressure-relief valves, on-and-off valves and non-return valves. They are available in H.D. polythene, rigid p.v.c., and Fluon.



Fine adjustment valve in plastics with Fluon seat

Approximate prices for the new fine-adjustment valve are: ½ in., £9; 1½ in., £17.

NU-SWIFT CO_2 FIRE EXTINGUISHER

INTRODUCTION of a leak-proof 10 lb. carbon dioxide fire extinguisher, model 1510, is announced by **Nu-Swift Ltd.**, Elland, Yorks. The result of three years' experiment, the new model supersedes a similar Nu-Swift extinguisher of the same capacity, known as model 1210.

Mainly intended for fighting inflammable liquid fires, and fires involving electrical equipment indoors, the new extinguisher has a 15 ft. range compared with only 8 ft. in the case of the old model. Because of a re-designed nozzle, the fire fighting capacity of the extinguisher has been doubled, the new model being capable, in the hands of an experienced fire-fighter, of putting out an 18 sq. ft. inflammable liquid fire.

Carbon dioxide, although less efficient

for fire fighting than dry powder, is non-damaging in use and leaves no residue, while it can be made to penetrate into places otherwise inaccessible.

ROLLER EXTRUDER INTRODUCED

A POSSIBLE solution to the handling of wet-solid pastes, such as those produced from a filter or centrifuge, which would appear to be beyond the scope of conventional conveyor drying equipment, comes from **John Dalglish and Sons, Ltd.**, Thornliebank, Glasgow. For the past two years this firm has been extending its interests into chemical engineering, and through their association with Proctor and Schwartz, Inc., Philadelphia, they now make and distribute the full range of Proctor industrial drying equipment for the home market and for export. The rolling extruder is one of a number of pre-forming feeds developed and patented by the U.S. company, and recently introduced to the British market by Dalglish.

Low-cost conveyor drying may now, it is said, be within the reach of chemical manufacturers and others. With this ancillary plant it is possible to transform bulky homogeneous masses of raw material into relatively small units of substantially uniform cross-section. The rolling extruder overcomes certain technical difficulties. Some materials, for example, cannot withstand the mechanical agitation to which they would be subjected in the orthodox type of extruder. Extrusions would lose their shape if the materials had become too soft, and if the orthodox extruder action caused the materials to become too hard, the clogging could halt the extruder mechanism.

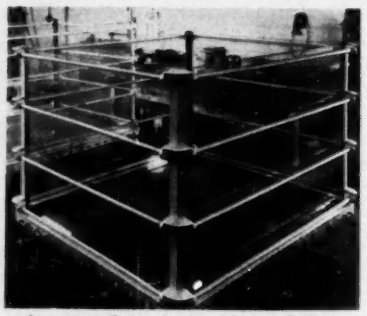
Primarily, the equipment consists of a rigid framework on which is mounted an arc-shaped perforated die plate. The die plate and the conveyor-band of the drier are of equal width. Over the die plate is a cradle or hopper structure with rubber covered rollers, the roller ends having sprockets which engage in racks to ensure true rolling action. This structure is so arranged that the rollers, in light contact with the die plate, can move backwards and forwards across it with a slow pendulum action.

Any material in suitable plastic form loaded into the hopper is directed between the die plate and the rollers, the movement forcing extrusions of equal cross-section and substantially of equal length through the die plate to the conveyor band below. By varying the speed of the conveyor band and the reciprocating speed of the hopper it is possible to control the depth of the bed of extrusions. The interstices between the extrusions provide a path for the flow of drying air. The surface area of material exposed in this way ensures rapid and even drying.

In chemical manufacturing, the rolling extruder has been successfully introduced for the handling of titanium dioxide, uranium precipitate, iron oxides, lithopone, and metallic stearates.

Q.V.F.'s NEW ARMOUR PLATE GLASS TANKS

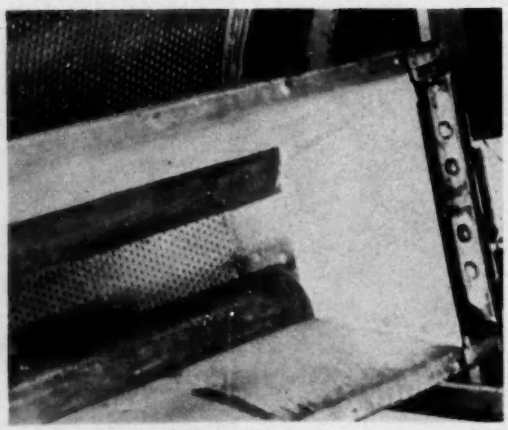
ARMOURPLATE glass tanks are the latest industrial - glassware product to be marketed by **Q.V.F. Ltd.**, Fenton, Stoke-on-Trent. The tanks are made of polished plate-glass which has been subjected to heat treatment to give it greatly increased mechanical strength and a high degree of resistance to mechanical impact or thermal shock. Advantages of the tanks include durability, transparency and a high standard of cleanliness.



Armour plate glass tank by Q.V.F.

Only chemicals to affect the glass are hydrofluoric and glacial phosphoric acids or strong caustic solutions.

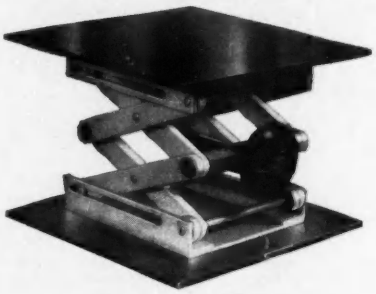
In constructing the tanks, precision-worked sheets of toughened glass are held together by a rigid metal base frame with an external framework of metal tension-rods and corner blocks. The narrow joints are sealed with continuous gaskets, approximately 1/16 in. thick of a material selected to withstand specific chemical conditions. The tanks are particularly suitable for coupling to Q.V.F.'s visible-flow pipeline systems.



Shown here is the roller action of the hopper over the perforated die plate

TOWERS INTRODUCE LABJACK

THE new Towers Labjack, which has been introduced by **J. W. Towers and Co. Ltd.**, Victoria House, Widnes, will lift up to 20 lb. from zero height. Constructed of anodised light alloy it is convenient for operations calling for the careful raising or lowering of equipment such as water baths, oil baths, heating mantles, etc.



Towers new Labjack

Other uses include supporting Dewar flasks containing refrigerants when in cooling traps in vacuum systems; supporting flasks and other laboratory ware which must be readily removable, such as in assemblies of interchangeable ground joint glassware.

The 8 in. square top and bottom plates can be removed. From a minimum height of 3¼ in., the Labjack will extend to 11¼ in. giving a maximum lift of 8 in. When slightly extended, it will lift up to 56 lb. Price is £7 15s.

ROBUST POLYTHENE CONTAINER

A 50-gall. polythene container, made available by **Tool Treatments (Chemicals) Ltd.**, Colliery Road, Birmingham Road, West Bromwich, is the latest addition to the Black Knight range of plastics products marketed by this company. The robust container is cast in exceptionally heavy gauge polythene. In spite of its large capacity it is said to be very rigid and substantial and should not be confused with plastics liners. It will in fact stand without support and resist distortion even when full.

The containers are available in flexible polythene at £9 each, or in rigid sterilisable polythene at £9 15s.; prices at works. The latter type has a softening point of 116°C, a melting point of 130°C, and a low temperature brittle point of −70°C. Dimensions are 34 in. deep by 24 in. top diameter by 22 in. base diameter. Stated to be impervious to corrosion by acids, the containers are suitable for liquid storage for many industries. They are light in weight and can be easily handled.

NEW KENT COMMANDER INSTRUMENT

NEW to the Commander range of **George Kent Ltd.**, Luton, is the Kent-Barton mercuryless diaphragm instrument for the measurement of differential pressures in six maximum ranges, and up to 2,500 lb./sq. in. working pressure.

These instruments, available intrinsically as circular-chart recorders, sector-scale indicators and circular-scale indicators, incorporate the Barton patented rupture-proof differential unit, which, although employing sensitive bellows for its actuating element, may be subjected to pressure differences equivalent to the pressure rating of the instrument without damage.

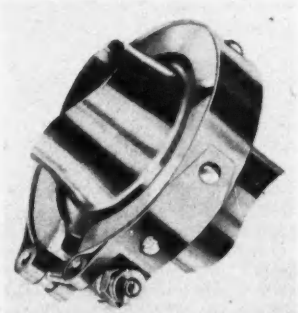
The torque-tube drive for conveying bellows movement to the instrument-index mechanism is leakage-free and requires no periodic lubrication. Only the bellows exteriors are exposed to the metered fluid, and the unit is therefore completely self-draining or venting; is without pockets to trap condensates and sediment formations; has no small tubes or other restrictions to interfere with its function.

To these recorders and indicators for flow, level, specific gravity, etc., can be added, with certain limitations, additional measuring elements for pressure (bourdon tube) and/or temperature (mercury-in-steel); also air-operated automatic control or transmission of the primary variable by incorporation of one of the new Kent Mark 30 series of units. Other optional instrument functions are integration of rate of flow and, for recorders, crescent-scale indication.

NEW H.T. VEE-BAND COUPLING

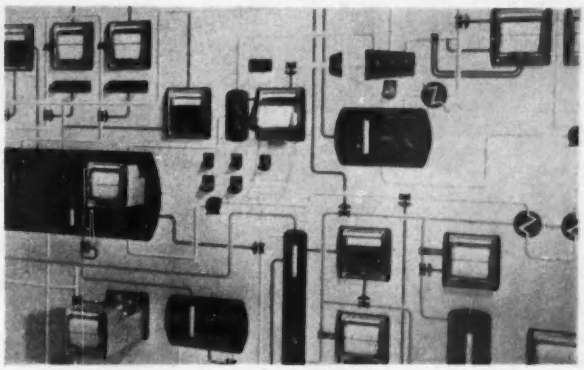
A PIPE coupling now made available by **King Aircraft Corporation,** Hillington, Glasgow, has been developed and tested for operation at elevated temperatures and for use with corrosive materials at pressures in 6,000 p.s.i. range. Termed 'Conoseal,' the unit is based on the Vee-band clamp principle and together consists of a male and female flange and all metallic gasket.

The flanges are suitable for either lap or butt welding to the pipeline or duct. The standard range offered covers pipe bores from ¼ in. to 10 in. diameter, and can be supplied in aluminium alloy, mild steel, stainless steel or Inconel materials, depending on the temperature and fluid characteristics involved. Non-standard couplings have been made up to 36 in. diameter. Operating temperature ranges from −184°C to +980°C.



Pipe coupling for high temperatures

The Vee-clamp type coupling offers great advantage where rapid connection and disconnection is required. Low weight and small envelope characteristics are considerable when compared with bolted flange joints. The Conoseal, by virtue of its all metallic construction, has a wide application for pneumatic and hydraulic control lines, is resistant to liquid CO_2, liquid nitrogen and liquid sodium; is being applied successfully to coolant and purging systems for atomic power plant installation.



Part of a recent Foxboro - Yoxall graphic panel showing the use of the compact Consotrol range of instruments

STABILAG INTRODUCE NEW OVEN

A NEW oven is now being introduced by the **Stabilag Co. Ltd.,** Market Road, Hemel Hempstead, Herts. Features found to be desirable in oven construction over many years have been incorporated.

A high grade refractory brick lining is used on all sides of the interior except for the internal surface of the vertically sliding door which is faced with Marinite. Behind the brickwork is a secondary thermal insulation consisting of 3 in. thick slabs of Caposil. This thermal insulation allows a maximum temperature of 1,000°C to be achieved on a loading of only 12 kW. The loading, and the maximum temperature, can be increased to meet specific requirements.

The unit stands on a 20 in. high robust sheet steel base of folded and welded construction. The central portion includes a folded back control panel which gives immediate and uninterrupted viewing of the controls from a normal standing position. Inside the base are counter balance weights which enable the door to be raised easily and quickly.

The sheet metal which forms the base actually extends to cover the whole of the oven apart from the door. It provides an air space around the oven proper which provides an added measure of insulation while at the same time keeping the outer surface free from heat. Air-space insulation is also used in the observation window of the door which consists of two layers of quartz.

The oven's internal dimensions are: height 18 in., depth 12 in., width 36 in., volume 4½ cu. ft.

FOXBORO CONSOTROL RANGE

FOXBORO - YOXALL'S Consotrol range of indicators, controllers and recorders has been developed to meet the needs of centralised control systems. Illustrated is a close up of part of a graphic panel recently completed at the company's new Redhill factory.

Two of the M/54/58 pull-out recorder controllers are shown partially withdrawn on the left. These instruments slide in and out of a sheet-steel housing which is secured to the panel and to which are attached the external connections. These electric and pneumatic connections are of the plug-in type and when the unit is withdrawn from the panel a series of air check valves automatically closes to prevent loss of pressure in the impulse lines.

This pull-out feature allows a complete instrument to be replaced with the minimum of interference with the process operation. It can be removed from the panel and replaced by a service spare unit on which the setting index and controller settings have been adjusted to agree with the values already obtained.

The M/54 indicator is identical to the M/54 recorder except that the chart drive mechanism is replaced by an indicating scale. The parts are interchangeable with the recorder and all functions are the same so that the operator is not faced with different operations on the same panel in order to perform the same functions from instrument to instrument.

There are a number of M/5001 ribbon indicators, which provide a visual indication of process activity by means of a brightly coloured nylon ribbon that rises and falls in direct relation to increase or decrease of measurement. The two M/54/58 recorder controllers in the top left are linked, as part of a cascade control system with M/57 SR switch and regulator sub-panels. These small panels provide for manual operation of the control valve and manual setting of the control index from the front of the panel.

Further information on the Consotrol range may be obtained from Foxboro-Yoxall Ltd., Redhill, Surrey.

PEOPLE in the news

● The retirement of MR. R. T. COOKE, founder and chairman of Cooke's Explosives Ltd., Penrhyndeudraeth, was marked by a complimentary dinner held recently at Harlech, when he and Mrs. Cooke were entertained by Deudraeth Rural Council, whose members presented him with an illuminated address. Referring to his retirement at the age of 79, Mr. Cooke said he would not be inactive as he would collaborate with his son, MR. DAVID COOKE, in tht manufacture of sodium chlorate weedkiller. At his Llandbedr home, Mr. R. T. Cooke has a small but well-equipped laboratory in which to work.

● MR. HUGH S. SUTHERLAND, who has been elected president of Shawinigan Chemicals Ltd., Montreal, in succession to the late DR. R. S. JANE who died recently, was formerly executive vice-president and general manager of the company. Educated at Mount Allison and McGill Universities and the Imperial College, London, Mr. Sutherland joined Shawinigan Chemicals at Shawinigan in 1931 attached to the plant research laboratory. He was works manager at St. Maurice Chemicals, Lac a la Tortue, from 1942-44, and became general sales manager of Shawinigan Chemicals in 1945; vice-president, sales in 1947 and executive vice-president and general manager in 1956.

R. C. Dickie, works general manager of Marchon Products, who has become a director (C.A., 13 December, p. 1000), joined the company in 1946 as chief chemist

● MR. V. L. GREGORY has been appointed managing director of Charles Lennig and Co. (Great Britain) Ltd., 26 Bedford Row, London W.C.1. He succeeds MR. A. M. MILLER who is returning to the parent company, Rohm and Hass, Philadelphia, U.S.

● MR. GEORGE S. SANDERS was recently appointed head of the newly formed group productivity services department of the Solartron Electronic Group Ltd., Thames Ditton, Surrey. Formerly with I.C.I.'s General Chemicals Division as a plant engineer, from 1942 to 1945, he specialised in design work in armaments, returning in 1945 to the I.C.I. Plastics Division. From 1948 to 1958 he was with Urwick, Orr and Partners Ltd., management consultants.

● MR. D. G. TURNER, of 66 Windemere Street West, Gateshead-on-Tyne 8, Co. Durham, has now been appointed to succeed the late MR. G. A. SMITH as northern representative for G. H. Zeal Ltd., Lombard Road, Morden Road, London S.W.19, and started his duties on 1 January.

● DR. PHILIP H. SYKES, has resigned from the board of the British Oxygen Co., on accepting appointment to the board of Albert E. Reed and Co., as research and development director of the Reed Paper Group. Dr. Sykes held a similar position at British Oxygen.

● MR. EUGENE J. HOUDRY, founder of the Houdry Process Corporation and, more recently, organiser of Oxy-Catalyst, Inc., is to receive the Perkin Medal of the Society of Chemical Industry. The award will be made at a dinner at the Waldorf-Astoria Hotel, New York, on 9 January.

● On a recent tour of I.C.I. divisions before leaving for Canada to become president of Canadian Industries Ltd., MR. P. C. ALLEN, a main board director, unveiled the name-plate of the ninth diesel locomotive to be put into service at Billingham. A railway enthusiast with articles and books to his name, Mr. Allen named the loco 'Iburndale' after a small river and then drove it for a distance of two miles.

Death of Prof. Wardlaw, R.I.C. President

PROFESSOR WILLIAM WARDLAW, C.B.E., D.Sc., who died on 16 December, 1958, was president of the Royal Institute of Chemistry which he had served continuously and in various capacities since he was elected to the Council in 1929. He was elected president in April 1957.

Professor Wardlaw was born in 1892 and educated at Rutherford College and Armstrong College, now King's College, University of Durham. In 1913 he showed his great promise in the inorganic chemistry field by gaining the Freine-Marecco Medal and Prize and in the award of an 1851 Royal Exhibition in 1851. His D.Sc. was awarded for his series of papers dealing with the oxidising properties of sulphur dioxide.

In the first world war he volunteered for military service and was transferred to the Army Reserve and employed as a chemist in the Ministry of Munitions. He became a lecturer and later senior lecturer in inorganic chemistry in the University of Birmingham. In 1937, he was appointed Professor of Physical Chemistry at Birkbeck College, London, where he remained. His work there was concerned with co-ordination compounds and latterly in the alkoxides of titanium, zirconium, hafnium and other elements.

During the last war he was joint secretary of the War Cabinet Scientific Advisory Committee (1941-45) and secretary to the Scientific Advisers, Ministry of Production. Later he became scientific adviser to the Technical and Scientific Register, Ministry of Labour and National Service. He was also a member of the Chemistry Research Board.

From 1940 to 1948, Professor Wardlaw was hon. secretary of the Chemical Society and its president from 1954 to 1956. He was president of the British Association, Section B, at its Belfast meeting in 1952 and became general secretary for the association in 1955

General Aniline's New Solid Nonionic Detergent Available in U.K.

THE first solid nonionic detergent claimed to have a cleaning power equal to that of liquid nonionics has been perfected by Antara Chemicals, a division of the General Aniline and Film Corporation, U.S., and is available in the U.K. Designated Antarox DJ-970, the new surfactant is designed for use in heavy-duty-type detergent formulations for either domestic or industrial use.

Selling agents in this country are Fine Dyestuffs and Chemicals Ltd., Calder Street, Manchester 2.

Essentially a 100%-active product, Antarox DJ 970 is composed of alkylphenoxypoly(ethyleneoxy)ethanols. Slightly off-white in colour, it is soluble in water, aromatic solvents, methanol, and ethanol, and is nearly neutral in pH. It is virtually nontoxic in formulated products.

Detergents based on Antarox DJ 970 are stated to be characterised by the same detergent effectiveness, soil-suspending, and low-foaming properties already associated with detergents based on liquid nonionics. In addition, they may be of the low-density, free-flowing type that have proven popular with housewives.

The new Antara surfactant, unlike many nonionics, does not go through a strong gel phase while going into solution and, therefore, may be diluted more rapidly and with less trouble. Because of its high melting point and brittleness, it can be dry-blended in either ribbon blenders or tumble mixers, which provides a reduction in formulation time and a simplification of the process. Also, Antarox DJ 970 is frangible enough to be broken down into the same particle size as the other ingredients, resulting in a uniform, free-flowing powder. Experimentally it has proven to be effective in preventing the formation of lime-soap curds—'bathtub ring'.

Overseas News

MITSUI OPERATING FIRST ACID PLANT EMPLOYING NEW S.D. PROCESS

FIRST commercial plant utilising the unique liquid-phase air-oxidation process for the manufacture of terephthalic acid from petroleum based feedstocks is now in operation for Mitsui Petrochemical Industries Ltd., at Iwakuni City, Japan. The plant start-up was accomplished in just over one year from the signing of the agreement. This short interval for plant design and construction can be attributed substantially to Mitsui's remarkable concentration of effort and their working closely with Scientific Design Co. who designed the plant.

This terephthalic acid plant is another unit of Mitsui's $30-million petrochemical project which includes ethylene oxide by direct air-oxidation, ethylene glycol, cumene by alkylation of benzene with propylene, and para-xylene. These and the other plants (all designed by S.D.) in the Mitsui complex are in operation except for the para-xylene plant which is still under construction. An important share of the Iwakuni plants' output will be diverted to the Toyo Rayon Co., one of the eight Japanese firms financing the project. Toyo will ultimately use the chemicals to manufacture synthetic textile fibres of the polyamide and ester types.

Other terephthalic acid plants abroad licensed to use the liquid-phase air-oxidation process are being designed by S.D. for Imperial Chemical Industries Ltd. in Wilton and Maruzen Oil Co. Ltd. in Japan.

Some Import Restrictions Removed by France

France has removed quantitative import restrictions on some 200 categories of goods from her partners of the Organisation for European Economic Co-operation. The list of goods includes pyrites, sulphur, graphite, a number of basic chemicals, tar and by-products, fertilisers, varnishes and paints, a number of essential oils and solvents.

Wyandotte Pinpoint Possible Causes of Explosion

The explosion which occurred recently in the recycle section of Wyandotte Chemicals, Geismar, La., new ethylene oxide and ethylene glycol plant, has resulted in complete shutdown of production. Reasons for the explosion are stated to be two mechanical failures. The first of these occurred in the governor of the recycle compressor. The pivot pin on the governor fulcrum fell out, causing the compressor to speed up excessively. The compressor was immediately shut off automatically and an alarm was sounded. The operators then turned on the remote control shut-offs for the valves on the oxygen and ethylene feed lines. The valve controlling the ethylene input worked correctly, but that for the oxygen line did not close soon enough. This caused an excessive build-up of oxygen in the oxygen-ethylene mixture. It was this mixture which exploded.

The company stresses that the explosion was due to mechanical breakdown and not to any inherent defect in the process itself. Rebuilding of the damaged facilities is in progress and the plant is expected to be in operation in three months' time. Additional control and safety features will be included to prevent repetition of a similar mishap.

Pakistan Dye Works in Operation Soon

A Pakistan Industrial Developments Corporation project, the Pak Dyes and Chemicals plant, is expected to begin operations early next year. The project was undertaken in partnership with a German company. The plant is designed to produce 250 tons of congo red and 300 tons of sulphur black a year. Pakistan Industrial Developments are planning further factories to produce dyes.

German South African Associate Opens p.v.a. Plant

A plant to make polyvinyl acetate belonging to Mowillith Co. of South Africa, an associate company of Farbwerke Hoechst of Germany, has been opened at Mobeni, Durban. The Dutch Hamer Holding also have an interest in the plant.

Flame-resistant polymers

From the Standford Research Institute, U.S., W. A. Skinner reports a new potentially cheap approach to producing flame-resistant polymers. This is through the non-catalytic addition of trichlorobromo-ethane to olefins. The free radical reaction, is stated to lead to highly chlorinated monomers through a second step in which hydrogen bromide is eliminated. With ethylene as starting material, the reaction gives 3,3,3-trichloro-propene-1, which polymerises readily or can be polymerised with ethylene or vinyl acetate to give highly flame-resistant polymers.

Hungary Plans to Increase Pharmaceutical Output

Hungary plans to multiply pharmaceutical production 25 times by 1965 compared to 1949. Reconstruction of the country's three largest pharmaceutical factories, the United Drug and Food, the Chinoin and the Köbánya has already begun with this end in view.

United Drug and Food have produced a local anaesthetic, Lidocain, and two new penicillin products, Retardillin and Promptcillin. The Köbánya Drug Factory markets the following: Mideton muscle relaxant; Aviamin, anti-seasickness preparation; Amifor, a tranquiliser; a new 'pep pill,' Centedrin; Suprastin, an antihistaminic drug; and Spiraktin, a respiratory excitant. The Chinoin factory produces Bucordan, an antidiabetic drug.

Denmark's Stocks of Fertilisers

According to the Danish Statistical Department, Denmark's raw material stocks of fertiliser materials on 30 September last compared with 30 June (nil) were (in thousands of tons): calcium nitrate 220.0; superphosphate, 155.0; and potash fertiliser 117.0.

Polymer Corporation to Extend Synthetic Rubber Capacity

Polymer Corporation Ltd., Sarnia, Ontario, state they produced a total of 130,000 tons of synthetic rubber in 1957. Of this more than 70 per cent was exported to over 60 countries. Plans are now under way for a substantial rise in capacity.

Reichhold Resin Plant for Hongkong

The newly-formed Reichhold Chemicals (Hongkong) Ltd., the 38th producing subsidiary of Reichhold Chemicals Inc., are to erect a plant in Hongkong. Due in production next spring, it will produce a number of artificial resins for use in the polyester plastics, paint and lacquer, paper, textile, colour printing and wood processing industries.

Rise in W. Germany's Chemical Industry Turnover Expected

The West German chemical industry estimates its turnover for 1958 at £1,530 million, compared with the previous year's £1,460 million. Exports for the first three quarters totalled £289 million, 1.6 per cent more than in the corresponding period of 1957.

Oxygen Works for Beira

A factory for the manufacture of oxygen and acetylene gas is to be built in the industrial quarter of Beira, P.E.A. The factory is being commissioned by the Sociedade Mocambicana de Gases (Mogas), who have a similar plant in Lourenco Marques.

New Rhodesian Phosphoric Acid Plant

From South Rhodesia, Barclays Bank D.C.O. report that African Explosives and Chemical Industries (Rhodesia) Ltd., recently started production of phosphoric acid for the manufacture of triple superphosphate. The new plant, near Salisbury, cost some £3,750,000 and will enable the company to produce up to 60,000 tons of triple superphosphate each

year, which is more than enough to meet the Federation's needs.

In addition, the company is to erect a £85,000 plant for aluminium sulphate which is used for water purification.

Swiss Fertiliser Plant in Iraq

The Swiss firm of Ammonia Casale are to build, at a cost of about Sw. Fr.100 million (about £8,335,000), a synthetic fertiliser plant in Iraq. Products will be based on natural gas and manufactured by ammonia synthesis processes.

Laboratory Equipment in Russia

In the most recent available issue (No. 24) of the Russian journal *Industrial Laboratory*, two Soviet chemists, L. N. Lomakina and P. K. Agasyan, describe a new micro-electrode designed for potentiometric filtration said to be a great improvement on the B.I. Frid-specification micro-electrode previously used in the U.S.S.R.

The upper part of the electrode is in the form of a mercurous chloride or mercuric sulphate-mercury equalising electrode. A second tube, filled with agar-agar and forming a link between the measuring solution and this equalising electrode, leads into it. The agar-agar with which it is filled is saturated with potassium chloride. Through this second tube runs a capillary tube from the underside of which a platinum electrode projects. On the upper side of the capillary tube is mounted a ground cap. The whole is said to be just as sensitive as an electrode of the usual composition of two separated semi-elements, and may be stored over long periods of time if it is placed with its lower parts in a potassium chloride solution. The micro-electrode is said to have proved its worth in primary testing use in the titration of very small quantities of fluids.

Montecatini to Co-operate in Persian Fertiliser Plant

Societa' Montecatini have been appointed general advisers to the Persian Government for the nitrogen-fertilisers plant which is to be built near Schiraz by E.N.S.A. (a joint Anglo-French concern). A 140-miles long pipeline will be built to bring natural gas from Gasharan and this gas will be utilised to produce up to 100 metric tons a day of ammonia anhydride.

The pipeline will be used also to provide the Schiraz with gas service. The cost of the plant and pipeline will total about $30 million.

A Liquid Nitrogen Generator

A new ADL liquid nitrogen generator system is being manufactured by Arthur D. Little Inc., Cambridge, Massachusetts, U.S. It provides a complete nitrogen liquefying facility. Operation is stated to require only push-button start and stop while automatic controls permit extended operation with attention. Major components include the ADL nitrogen column, modified Norelco gas liquefier and 200-l. storage tank, automatically providing up to 95 l. daily of 99.5% pure liquid nitrogen. The system is reported as proving economical to industrial and laboratory users who have moderate demands for liquid nitrogen. (*Journ. Franklin Inst.* 1958, **266**, 372).

Oil free air at a slight positive pressure is supplied by the blower of the nitrogen column. Water vapour and carbon dioxide are frozen out in the heat exchanger. Air is rectified in a packed column, and the nitrogen gas is passed from the top of the column to the modified condensing head of the Norelco liquefier. The high purity nitrogen is liquefied and the non-condensible gases are continuously bled off. A portion of the liquid is used as a reflux to cool the column and the rest is drawn off as product to a storage tank or transfer dewar.

Dutch Sulphuric Acid Works Build Carbon Black Plant

The Royal Sulphuric Acid Works, late Ketjen Ltd., Amsterdam, have decided to erect a plant for the manufacture of carbon black in the Netherlands. A new company is to be founded bearing the name of Ketjen Carbon Ltd., the management of which will be in the hands of the Royal Sulphuric Acid Works, late Ketjen Ltd., who possess the majority of the shares of the new company.

Under a licence agreement concluded with Godfrey L. Cabot Inc. Boston, Massachusetts, U.S., Ketjen Carbon will be able to make use of the patents and technical know-how of the U.S. company. The Dutch factory, the erection of which will require a capital investment of about 13 million guilders, will be built in the Western part of the Botlek area of Rotterdam. This industrial district is in the immediate neighbourhood of the oil refineries that will probably supply the base materials. The new factory, whose production capacity has initially been planned at about 13,000 tons of carbon black a year, will be entitled to sell its products all over the world. It is intended to produce a full range of so-called high-quality oil furnace blacks for the rubber industry.

Reichhold in Holland

First Dutch branch of the international Reichhold group was opened in the form of a sales office on 1 January at 's Hertogenbosch. The address of the office is Verkoopkantoor Reichhold Holland, 's Hertogenbosch, Zuid Willemsvaart, 141a, Postbus 239.

Despite Recession U.S. 1958 Sulphur Exports Reached Near-record Level

ALTHOUGH U.S. sulphur producers were hit by a recession in domestic markets in 1958, they were able to increase exports to near-record levels.

In an annual review Charles A. Wight, president of Freeport Sulphur Co., reported that an increase in U.S. consumption toward the end of the year was insufficient to bring the annual rate to that achieved in 1957. He added, however, that shipments abroad reached an estimated 1,575,000 tons, which is slightly higher than in 1957 and only 75,000 tons below the 1956 record.

Preliminary data indicated that total domestic consumption of sulphur was slightly lower than 1957, reflecting the lower output of such major consuming industries as paper, steel, petroleum refining, rubber and textiles. On the other hand, the relatively good year experienced by the fertiliser industry and segments of the chemicals industry, two of the largest consumers of sulphur, helped to bolster consumption.

Sulphur production was also down, Mr. Wight said. Total output from all sources in the U.S. amounted to an estimated 6,200,000 long tons, compared with 7,000,000 tons in 1957. The drop in production was the result not only of lower consumption but also of increased imports and, more significantly, a cutback in stockpiling.

Of the total production, three quarters was brimstone mined by the Frasch hot-water process from salt dome deposits located along the coast of the Gulf in Louisiana and Texas. Indicated Frasch production was approximately 4,650,000 tons, compared with 5,490,000 tons in 1957. Of the balance of the output, 630,000 tons represented elemental sulphur recovered from refinery gases and sour natural gas; 400,000 tons sulphur contained in pyrites; and 520,000 tons sulphur in various forms from other sources.

Imports were at a record of approximately 760,000 tons, compared with 669,000 tons in 1957. The bulk—an estimated 600,000 tons—was Frasch sulphur produced from mines in Mexico.

Twelve Frasch-process mines were in operation in the U.S. in 1958, including a new mine opened in May by Texas Gulf Sulphur Co. at Fannett, Texas. Texas Gulf remained the largest producer, followed by Freeport Sulphur Co., Jefferson Lake Sulphur Co., and Duval Sulphur and Potash Co.

Quoted price of sulphur in the U.S. has remained unchanged since the reduction of $3 a ton effected late in 1957. Prices during 1958 were quoted at $25 a long ton f.o.b. port and $23.50 f.o.b. mine.

Two new U.S. salt dome deposits are under development, both projects of Freeport Sulphur. The largest is Grand Isle, a discovery described as being of major magnitude located off the Louisiana coast in 50 ft. of water seven miles from the nearest land. The second, known as Lake Pelto, is situated some miles away in the shallow, partially protected water along the coast. At Grand Isle, a steel structure measuring nearly a mile in length was nearing completion at the year's end, and production is expected in 1960.

Commercial News

Borax (Holdings)

An announcement from Borax (Holdings) Ltd., indicates that the net income of the U.S. operating company U.S. Borax and Chemical Corporation, for the year to 30 September, amounted to $2,370,314 on sales of $53,057,764. This compares with a net income of $5,470,931 on sales of $50,987,907 for the previous year. Earnings for the common stock amounted to 41 cents on 4,186,325 shares, against $1.15 on 4,183,900 shares.

Sales passed all previous records, it is reported. Those for boron products improved, but potash volume was down. The reduced earnings are in the main attributed to starting-up difficulties and expenses associated with the new plants at Boron, California, to lower returns from the potash operations; and to higher charges for depreciation.

Benefits have now started to accrue from the new plant, it is stated, and the corporation anticipates a good demand for its boron products in 1959 if the improvement in business conditions continues.

I.C.I. (Hyde)

For administrative reasons, the Leathercloth Division of Imperial Chemical Industries was dissolved on 1 January, and has become I.C.I. (Hyde) Ltd., of which I.C.I. will be sole director and manager. The present directors of the division will become delegate directors of I.C.I. (Hyde), which will be a 100% subsidiary of I.C.I., carrying on all the present business of the Leathercloth Division.

Turner and Newall

Although figures for the current year of the Turner and Newall group of manufacturers of asbestos, magnesia and allied products may not be as good as those for 1957-58, the chairman, Sir Walker Shepherd, states that it is not anticipated that any reduction will be of a serious character.

Group net profit totalled £5,973,524 against £5,857,229. Year-end group fixed assets increased from £28,837,727 to £32,003,919, reflecting further outlay for expansion and modernisation schemes. Outstanding capital commitments totalled £2.75 million (£3 million).

The level of activity at the factories of the Washington Chemical Co. Ltd., was somewhat less than last year. This was due principally to the effect of a general diminution in the industrial demand throughout the country and increased competition in export business.

Farbenfabriken Bayer

Farbenfabriken Bayer A.G., Leverkusen, have announced that there will be no cause to raise the company's capital in the coming year as a result of the large-scale investment scheme for 1959 which is to be embarked upon.

• U.S. Borax Income Halved on Higher Sales
• Turner and Newall Profit up £116,295
• Bayer Net Sales Increased by £12 m.
• E.N.I. Plan Styrene and Butadiene Plants

The Bayer dividend will be up on the 11 per cent declared last year, say the directors, owing to the satisfactory development of business during the year; an exactly similar statement was recently issued by another I.G. Farben successor company, B.A.S.F. (see 'Distillates', 20 December).

Net sales of the Bayer concern, both at home and abroad during the past year have equalled some DM 2,000 million (about £167 million) as against DM 1,853 million (about £154¾ million) in the previous year. This increase, one of between 7 and 8%, is, however, only half that achieved in the 1957 financial year, which produced results 16.1% higher than those of 1956. By a further improvement of marketing and publicity outlets, say Bayer, exports could be raised to 42% (1957 : 41%) of total sales.

In the 1958 financial year, Bayer invested DM 250 million (about £20¾ million) in West Germany alone, primarily in the extension and rationalisation of the production of organic semi-manufactured goods. Some DM 50 million (about £4¼ million) has also been invested in joint participation schemes.

E.N.I.

Ente Nazionale Idrocarburi (E.N.I.) Rome, showed a net profit of L4,812,144,127 for the year ended 30 April. Of this L.621,821,619 is to be allocated to the E.N.I. research centre, S Donato, Milan, and L100 million to university institutions to finance scientific studies and research into hydrocarbons, and to the Petroleum Encyclopaedia promoted by E.N.I.

Natural gas production in 1957 amounted to 163,975 million cu. ft., representing an increase of 12.7%. Output of liquid and liquefiable hydrocarbons rose from 134,828 tons in 1956 to 216,706 tons in 1957, a rise of 61%. During the first four months of 1958 output included 60,480 million cu. ft. of natural gas and 78,747 tons of crude oil. Output for 1959 is expected to reach 1 million tons.

The Cortemaggiore gasoline recovery plant processed 35,840 milion cu. ft. of natural gas thereby producing 61,873 tons of products. Production of ammonia, nitric acid, ammonium nitrate, ammonium sulphate and synthetic rubber began at Ravenna during the year. Units for styrene production are due to be in operation in autumn 1959 and preparations are being made to build a second butadiene plant. This is due on stream in the course of 1959 and will use butane produced at E.N.I. refineries. Once all the installations have been completed, the Ravenna plant will have an annual capacity of 60,000 tons of synthetic rubber and 750,000 tons of fertilisers. It is stated by E.N.I. chairman, E. Mattei, that the Ravenna enterprise has led to an average reduction of 15% in the price of nitrogenous fertilisers in Italy.

B.P. Benzin und Petroleum

B.P. Benzin und Petroleum A.G., the West German B.P. subsidiary, are to raise the company's capital from DM.200 million (about £16,670,000) to DM.250 million (about £20,850,000). A further increase of DM.50 million (about £4,167,000) to a total of DM.300 million (about £25 million) is proposed by December 1960. The company has half shares, with Farbenfabriken Bayer, in the new Erdölchemie petrochemical plant now being built at Dormagen, on the Rhine.

Market Reports

NEW YEAR STARTS WITH PRICE RISES

LONDON End of the year influences have been in evidence on most sections of the industrial chemicals market with interests mainly centred on contract renewal terms for 1959.

A number of price increases will come into operation on 1 January. These include ammonium chloride, liquid chlorine, sodium bicarbonate, sodium carbonate monohydrate, sodium cyanide and sodium silicate.

The flow of overseas inquiry has remained steady but there has been little of fresh interest to record for the coal tar products and no information has come to hand of prices likely to operate in the new year.

MANCHESTER Seasonally quiet conditions have continued during the past week on the Manchester market for heavy chemical products. Deliveries under contracts have been resumed to some extent, but they are not expected to return to normal until next week. Meanwhile, fresh enquiry in virtually all sections has been slow and no big weight of actual business has been reported.

GLASGOW As was expected with the new year holiday period, trading during the past week was very much quieter on the Scottish heavy chemical market. It is hoped, however, for a return to normal business early in January.

TRADE NOTES

New I.C.I. Pigment

The latest addition to I.C.I. Dyestuffs Division's pigment range, Chromastral Green H-MS, is a co-precipitated blend of a lead chrome and a modified phthalocyanine blue. It is similar in shade and strength to the already well-established Chromastral Green MS but is controlled in manufacture so as to contain less than 5% of soluble lead, as determined by the official British Home Office test. It is, thus, of special value for pigmenting industrial finishes for spray application.

New Bakelite Polythene Grades

Bakelite Ltd., 12-18 Grosvenor Gardens, London S.W.1, are now marketing a new series of high clarity polythene film compounds which have the inherent properties of standard polythene films coupled with greatly improved clarity. The increased product visibility and non-distortion of product colour resulting from the use of film based on the new compounds, extends the scope of polythene packaging to a new range of goods.

Monsanto Polyflex Ink List

Monsanto Chemicals Ltd. have compiled a list of adhesives and printing inks recommended for use with Polyflex polystyrene film and sheet which the company is now marketing in this country.

Araldite Epoxy Resins

'Araldite Surface Coating Resins—Specialty Types' is the title of a new booklet published by Ciba (A.R.L.) Ltd., Duxford, Cambridge. Properties, uses and methods of use of a number of Araldite products are given, with a temperature conversion table.

Pease-Anthony Scrubbers

The chemical plant division of the Power-Gas Corporation Ltd., Stockton-on-Tees, has recently received an order for two Pease-Anthony scrubbers to treat gases from zinc sintering machines at the Swansea Works of the National Smelting Co. Pease-Anthony installations are successfully operating on blast furnaces, sintering plant, lime kilns, non-ferrous metal furnaces, spray driers, superphosphate plants, etc. The makers claim that Pease-Anthony gas scrubbers combine the advantages of high efficiency, low cost, low water requirements and low maintenance, in removing micron and sub-micron dust and mist.

Caposite Asbestos Insulation

Second in the new series of Caposite amosite asbestos technical Data Sheets on heat insulation issued by the Cape Asbestos Co. Ltd., 114-116 Park Street, London W.1, is devoted to internal and external flat surfaces. Diagrams show a preformed specification for the insulation of ducting with Caposite blocks protected with Caposil hard setting cement, reinforced with 1½ in. mesh galvanised wire netting and waterproofed with Capoplastic waterproofing compound. A table showing thermal conductivity of Caposite blocks gives a figure of 0.61 B.Th.U./sq. ft./hr./°F for a hot face temperature of 1,000°F (mean temperature 550°F).

Preservatives in Food

The Minister of Agriculture, Fisheries and Food and the Minister of Health have made the Public Health (Preservatives etc. in Food (Amendment No. 2) Regulations, 1958, which permit the import and sale of apples, pears, pineapples, peaches and melons, and articles of food containing any such fruit, which contain ortho-phenylphenol within prescribed limits. The preservatives subcommittee of the Food Standards Committee consider that there would be no hazard to public health in amounts of ortho-phenylphenol up to 10 p.p.m. on apples, pears and pineapples, 20 p.p.m. on peaches and 125 p.p.m. on melons.

Scopon Price Reductions

Styrene Copolymers Ltd. announce that as from 1 January, there has been a further price reduction in their Scopon range of modified epoxy esters. From the same date the prices of Scopol 41/HM/75 and Scoslat 100/35 have also been reduced.

Hickson and Welch Produce U.S. Nonionic Softening Agents Under Licence

Now available from Hickson and Welch Ltd., Castleford, Yorks, is the Bradsyn range of nonionic softening agents which are widely used in the U.S. for finishing purposes. Manufacturing rights on a licensee basis have been obtained from the Original Bradford Soap Works Inc. of Rhode Island, who developed the products.

The softeners which are fully compatible with all the commonly used resins and other finishes are Bradsyn (for non-wool fibres) and Bradtone (for wool). Based on polythene, the Bradsyns are supplied as liquids which disperse readily in cool water. They are compatible with thermoplastic resins, thermosetting resins, chlorides, starches, gums and all the commonly used finishing agents. They are stated to have a high order of resistance to abrasion and to laundering and dry-cleaning. They do not retain chlorine and consequently do not cause tendering during ironing or hot pressing. Similar claims are made of their resistence to scorching, yellowing and water-spotting.

Three distinct products are offered so that users have a choice of handle; they are described as giving a sleek, intermediate and dry silky feel respectively. Tests by the British finishing trade suggest that new standards may be set in the handle and durability of non-iron, crease-resisting, permanently pleated, drip-dry and other popular finishes.

Benn's Acquire 'Sales and Wants Advertiser'

The Sales and Wants Advertiser, oldest established monthly journal for the printing trade, has been acquired by Benn Brothers Ltd., publishers of CHEMICAL AGE and other trade and technical journals and directories. The new control operates with the January issue. 'The Printers, Lithographers, Bookbinders and Stationers Sales and Wants Advertiser,' to use its full title, was founded in 1887 by Mr. C. R. Jones and carried on, in turn, by his son, Mr. Christopher Jones, who died during last year.

Mr. Christopher Jones took great pride in the fact that the journal was the only remaining periodical of comparable circulation and advertisement revenue remaining in personal proprietorship. Friendly relations have always existed between the two family publishing businesses—Sir John Williams Benn also founded his business in the 1880's—and it is the intention of the new proprietors to continue *The Sales and Wants Advertiser* on the same lines which have established its unique character as an advertisement medium for the needs of all sections of the printing trade.

Mr. S. T. Bloxham, who has been managing the journal for many years past, will continue in that office and all other members of the staff are remaining with the journal. *The Sales and Wants Advertiser* will continue to be published from its offices at 4 New Bridge Street, London E.C.4, for the present.

DIARY DATES

MONDAY, 5 JANUARY

S.C.I.—London: 14 Belgrave Square, S.W.1, 6.30 p.m. 'Some uses of electronic computers in the chemical industry' by C. M. Berners-Lee.

TUESDAY, 6 JANUARY

I.Chem.E.—London: Geological Society, Burlington House, W.1, 5.30 p.m. 'Feed water and boiler water standards in C.E.G.B.' by R. Ll. Rees and F. J. R. Taylor; 'Treatment of water for an industrial high pressure boiler plant' by J. Arthurs, J. A. Robins and T. B. Whitefoot.

S.C.I.—Birmingham: Birmingham and Midland Inst., Paradise Street, 7.15 p.m. 'Alloys for high temperature service' by D. A. Oliver.

S.C.I.—London: 14 Belgrave Square, S.W.1, 6.30 p.m. 'Polycarbonates, their properties, processing and applications' by W. Hechelhammer.

WEDNESDAY, 7 JANUARY

S.C.I. & R.I.C.—Manchester: Lecture Theatre, University, 2.30 p.m. Symposium on 'New polymers and their applications'.

Soc. Instrument Technology—Sheffield: University, 7 p.m. 'Instruments for flame radiation and heat transfer measurements' by M. W. Thring.

THURSDAY, 8 JANUARY

C.S. with R.I.C. & S.A.C.—Edinburgh: North British Hotel, 7.30 p.m. 'Fluidisation' by J. F. Richardson.

Inst. Metals & S.C.I.—London: 17 Belgrave Square, S.W.1, 6.30 p.m. 'Electron probe-microanalysis' by T. Mulvey.

Plastic. Inst.—Leicester: Grand Hotel, 6.45 p.m. 'Polycarbonates' by W. P. Hechelhammer.

FRIDAY, 9 JANUARY

O.C.C.A.—Manchester: Blackfriars House, Parsonage, 6.30 p.m. 'Developments in modern organic pigments' by J. Glassman and I. S. Moll.

Plastics Inst.—London: Borough Polytechnic S.E.1, 10 a.m. Conference on 'Careers in plastics industry'.

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Specifications filed in connection with the acceptances in the following list will be open to public inspection on the dates shown. Opposition to the grant of a patent on any of the applications listed may be lodged by filing patents form 12 at any time within the prescribed period.

AMENDED SPECIFICATIONS

On Sale 28 January

Titanium tetrachloride. British Titan Products Co., Ltd. **724 193**

Dicarboxylic acids. Imperial Chemical Industries, Ltd. **757 505**

Oil-gas. Power-Gas Corp., Ltd. **761 735**

Aqueous emulsion gloss paints. Petrochemicals, Ltd. **790 060**

ACCEPTANCES

Open to public inspection 4 February

Pharmaceutical and veterinary preparations containing garlic. Schiefer, H. **808 568**

Polyurethanes. Phoenix Gummiwerke A.G. **808 571**

Improving the properties of polyethylene and other olefin polymerisation products Deutsche Gold- und Silber-Scheideanstalt vorm. Roessler. **808 286**

Vulcanisation process for rubber. Imperial Chemical Industries, Ltd. **808 431**

Rubber composition. Firestone Tire & Rubber Co. **808 289**

Polyurethane plastics and method of making same. Farbenfabriken Bayer A.G. **808 574**

Cyanoethyl ethers of starch and process for the production thereof. Monsanto Chemical Co. **808 290**

Process of making fermented malt beverages. Pabst Brewing Co. **808 432**

Film forming composition with plasticiser of terephthalamide derivatives. Soc. Industrielle de la Cellulose (S.I.D.A.C.) S.A. **808 366**

Desulphurisation of petroleum fractions. Compagnie Francaise de Raffinage. **808 599**

Production of thermoplastic polycarbonates. Farbenfabriken Bayer A.G. **808 485, 808 486 & 808 487**

Production of high molecular weight polycarbonates. Farbenfabriken Bayer A.G. **808 488**

Process for producing polycarbonates. Farbenfabriken Bayer A.G. **808 489**

Tows of polyacrylonitrile filamentary material and production thereof. American Cyanamid Co. **808 518**

Preparation of alkyl and cycloalkyl nitrates. Du Pont de Nemours & Co., E. I. **808 294**

Preparation of tetrafluoroethylene. Du Pont de Nemours & Co., E. I. **808 441**

Production of carboxylic acids. Continental Oil Co. **808 581**

Carrying out high temperature reactions by means of a continuous rotating electric arc and apparatus therefor. Du Pont de Nemours & Co., E. I. **808 442**

Evaporation of liquefied gases with simultaneous production of mechanical energy. British Oxygen Co., Ltd. **808 535**

Extraction of nucleic acid and for the preparation of the salts thereof. Vercambre, R. **808 296**

Catalyst activation and apparatus therefor. Phillips Petroleum Co. **808 452**

Compositions of matter. Imperial Chemical Industries, Ltd. **808 297**

Ethynyl magnesium halides. Beecham Research Laboratories, Ltd. **808 392**

Treatment of viscous solutions of normally solid polymers and polymerisation process embodying same. Standard Oil Co. **808 327**

Process for sulphonation of hydrocarbons. Continental Oil Co. **808 394**

Conversion of dimeric nitrosohydrocarbons into oximes. Mueller, E. **808 298**

Process and catalyst for polymerisation of polymerisable hydrocarbons. Phillips Petroleum Co. **808 456**

Soluble enzyme preparation and process of recovery of same. Schwarz Laboratories, Inc. **808 300**

Hydroxy-substituted polyethers and a process for their preparation. Bataafsche Petroleum Maatschappij N.V., De **808 301**

Vulcanisation of rubbers. Hercules Powder Co. [addition to 754 514.] **808 302**

Ceramic frit composition. National Lead Co. **808 401**

Thiophosphoric acid esters and their preparation. Farbenfabriken Bayer A.G. **808 304**

High-temperature greases stabilised against oxidation. California Research Corp. **808 596**

Manufacture of carbonic acid esters. Farbenfabriken Bayer A.G. **808 490**

Blue substantive dyestuffs of the anthraquinone series. Sandoz, Ltd. **808 603**

Dyeing of fibres and like structures of polyacrylonitrile and copolymers of acrylonitrile. Badische Anilin- & Soda-Fabrik A.G. **808 308**

Method and apparatus for treating fuel of high moisture content. International Combustion (Holdings), Ltd. **808 606**

Recovering hydrazine from aqueous solutions. Farbenfabriken Bayer A.G. **808 467**

Process and apparatus for the continuous manufacture of nitrocellulose. Hercules Powder Co. **808 609**

Sulphactive hydrogenation catalyst. Esso Research & Engineering Co. **808 336**

Trisiloxane. Midland Silicones, Ltd. **808 613**

Lubricating grease compositions. Bataafsche Petroleum Maatschappij N.V., de. **808 474**

Decontamination of neutron-irradiated uranium. Atomic Energy of Canada, Ltd. **808,477**

Separation of plutonium from neutron irradiated uranium. Atomic Energy of Canada, Ltd. **808 478**

Moisture-exchangers for air streams. Munters, C. G. [Divided out of 808 411.] **808 413, 808 414**

Method and apparatus for manufacturing sheeting, film or film base of organic high polymer material. [Divided out of 808 343.] Kodak Ltd. **808 344**

Open to public inspection 11 February

Treatment of uranium and uranium base alloys. Imperial Chemical Industries, Ltd., and Alexander, W. O. **808 831**

Separation of plutonium. Maddock, A. G., and Smith, F. **808 723**

Method of and equipment for cleansing surfaces of oily deposits. Groom, R. W. [Addition to 696 631.] **808 901**

Aqueous detergent compositions. Chemical Developments of Canada, Ltd. **808 805**

Oil purifier. Burn, J. E. F. **808 951**

Filters for use in removing noxious gases and solid matter contained in the exhaust gases of internal-combustion engines. Saunders, S. [Cognate application 3255.] **808 806**

Amines and processes for their preparation. May & Baker, Ltd. **808 952**

Resin compositions. Dunlop Rubber Co. Ltd. **808 953**

Curing synthetic elastomers. Dunlop Rubber Co. Ltd. **808 913**

Wet separation of mixtures of materials of different specific gravities. Markische Steinkohlengewerkschaft. **808 914**

Apparatus for separating paraffin wax from mixtures of wax and hydrocarbon oils. Edeleanu G.m.b.H. [Addition to 782 735.] **808 622**

Polyhydrochrysene compounds and process of making same. Reichstein, T. **808 903**

Recovery of gold from aqueous cyanide liquors. National Research Development Corp. [Divided out of 808 909.] **808 910**

Production of artificial filaments, yarns, threads and the like from viscose. Courtaulds Ltd. **808 838**

Pyridazines and process for their manufacture. Ciba Ltd. **808 623**

Expanded thermoplastic materials. Whiffen & Sons Ltd. **808 763**

Radiated energy absorbing materials. Eltro Gesellschaft & Co. Gesellschaft für Strahlungstechnik. **808 726**

L(−) and D(+) threo- β-(paranitrophenyl)-serine esters and a process for their manufacture. Parke, Davis & Co. **808 811**

Textiles articles formed from resinous material having improved resistance to development of surface charges thereon. Union Carbide Corp. **808 624**

Epoxidised esters of edipic acid. Rohm & Haas Co. **808 955**

Melting and casting of titanium and the production of titanium base alloys. Stone & Co. (Charlton), Ltd., J. **808 843**

Device for continuous fermentation in liquids. Jonas, V., and Koran, V. **808 905**

Plant for a continuous process for purification, treatment and utilisation of liquids, in particular waste water. Jonas, V. **808 906**

Preparing N, N¹-disubstituted formamidines. Olin Mathieson Chemical Corp. **808 767**

Synthesis of hydrocarbons. Union Carbide Corp. **808 956**

Anion-exchange resins. Permutit Co. Ltd. **808 844**

Recovery of gold from aqueous cyanide liquors. National Research Development Corp. **808 909**

Polymeric compositions. Olin Mathieson Chemical Corp. **808 730**

Preparation of platinum metal catalysts. Du Pont de Nemours & Co., E. I. **808 731**

Production of tetracyclinonitrile. American Cyanamid Co. **808 701**

Production of tertiary-butyl derivatives of anhydrotetracyclines. American Cyanamid Co. **808 702**

Solvent extraction of liquid petroleum oils. Texaco Development Corp. **808 661**

Process for the manufacture of pimelic acid. Goodyear Tire & Rubber Co. **808 849**

Metallisable monoazo dyestuffs and their use. Geigy, A.G., J. R. **808 919**

Synthetic resinous compositions. Shawinigan Resins Corp. **808 662**

Preparing amidic esters of di-thiophosphoric acids, and insecticidal compositions including said derivatives. Montecatini Soc. Generale Per L'Industria Mineraria e Chimica. **808 853**

Process for producing fertilisers. Lummus Co. **808 664**

Oils containing copolymers. Esso Research & Engineering Co. **808 665**

Ethylene polymerisation. Imperial Chemical Industries, Ltd. **808 667**

Process for the production of hydrocarbon oils. Bataafsche Petroleum Maatschappij N.V., De. **808 631**

Method for stabilising acid-activated chlorite solutions. Elektrochemische Werke München A.G. **808 669**

Glucose test indicator. Miles Laboratories, Inc. **808 742**

Preparation of polyurethane elastomers. Du Pont de Nemours & Co., E. I. **808 633**

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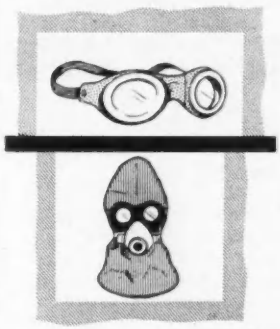

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